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ABSTRACT

Articles covering a wide spectrum of aquatic sports are presented as aids to teachers and coaches of swimming. Included are suggestions for teaching swimming to the handicapped and infants, specific techniques for developing swimming skills, and tips for boating education and water safety. (JD)

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NAGWS guide

National Association for Girls & Women in Sport

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Aquatics

JULY 1979 — JULY 1981

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NAGWS guide

Aquatics

JULY 1979 — JULY 1981

TIPS and TECHNIQUES
FOR TEACHERS and COACHES

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NATIONAL ASSOCIATION FOR GIRLS &
WOMEN IN SPORT
American Alliance for Health, Physical
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Join the National Association for Girls & Women in Sport—

The only national association devoted exclusively to creating sport opportunities for *all* females — *all* ages, *all* levels

NATIONAL ASSOCIATION FOR GIRLS AND WOMEN IN SPORT

The National Association for Girls and Women in Sport is a nonprofit, educational organization designed to serve the needs of participants, teachers, coaches, leaders and administrators in sports programs for girls and women. It is one of eight associations of the American Alliance for Health, Physical Education, Recreation and Dance.

PURPOSE

The purpose of the National Association for Girls and Women in Sport is to foster the development of sports programs for the enrichment of the life of the participant.

BELIEFS

The National Association for Girls and Women in Sport believes that:

Sports are an integral part of the culture in which we live.

Sports programs are a part of the total educational experience of the participant when conducted in educational institutions.

Opportunities for instruction and participation in sports appropriate to her skill level should be included in the experience of every girl.

Sports skills and sports participation are valuable social and recreational tools which may be used to enrich the lives of women in our society.

Competition and cooperation may be demonstrated in all sports programs, although the type and intensity of the competition and cooperation will vary with the degree or level of skill of the participants.

An understanding of the relationship between competition and cooperation and the utilization of both within the accepted framework of our society is one of the desirable outcomes of sports participation.

Physical activity is important in the maintenance of the general health of the participant.

Participation in sports contributes to the development of self-confidence and to the establishment of desirable interpersonal relationships.

FUNCTIONS

The National Association for Girls and Women in Sport promotes desirable sports programs through:

1. Formulating and publicizing guiding principles and standards for the administrator, leader, official, and player.
2. Publishing and interpreting rules governing sports for girls and women.
3. Providing the means for training, evaluating, and rating officials.
4. Disseminating information on the conduct of girls' and women's sports.
5. Stimulating, evaluating, and disseminating research in the field of girls' and women's sports.
6. Cooperating with allied groups interested in girls' and women's sports in order to formulate policies and rules that affect the conduct of women's sports.
7. Providing opportunities for the development of leadership among girls and women for the conduct of their sports programs.

STANDARDS IN SPORTS FOR GIRLS AND WOMEN

Standards in sports activities for girls and women should be based upon the following:

1. Sports activities for girls and women should be taught, coached, and officiated by qualified women whenever and wherever possible.
2. Programs should provide every girl with a wide variety of activities.
3. The results of competition should be judged in terms of *benefits to the participants* rather than by the winning of championships or the athletic or commercial advantage to schools or organizations.

Health and Safety Standards for Players

Careful supervision of the health of all players must be provided by —

1. An examination by a qualified physician
2. Written permission by a qualified physician after serious illness or injury
3. Removal of players when they are injured or overfatigued or show signs of emotional instability
4. A healthful, safe and sanitary environment for sports activity
5. Limitation of competition to a geographical area which will permit players to return at reasonable hours; provision of safe transportation.

General Policies

1. Select the members of all teams so that they play against those of approximately the same ability and maturity.
2. Arrange the schedule of games and practices so as not to place demands on the team or player which would jeopardize the educational objectives of the comprehensive sports program.
3. Discourage any girl from practicing with, or playing with, a team for more than one group while competing in that sport during the same sport season.
4. Promote social events in connection with all forms of competition.

SOURCES OF INFORMATION AND SERVICE

All requests for information about services should be addressed to: Executive Director, National Association for Girls and Women in Sport (NAGWS), AAHPERD, 1201 - 16th Street, N.W., Washington, D.C. 20036.

PREFACE

This NAGWS *Aquatics Guide: Tips and Techniques for Teachers and Coaches*, a biennial production, represents a "first" in a new publication series by the National Association for Girls and Women in Sport. Articles covering a wide spectrum of aquatic sport are presented as timely aids to teachers and coaches.

In case you have looked for official rules, a former inclusion in the NAGWS *Aquatics Guide*, these are now found in separate publications: the NAGWS *Swimming and Diving Guide*, August 1977-1978 and the NAGWS *Synchronized Swimming Rules*, January 1978-1979.

The NAGWS continues to seek input from all interested individuals as to how it can best provide publications and other materials that will facilitate the growth of quality sport programs in America. Your comments to the *Guide* chairpersons or the national office are invited.

Our sincere appreciation is extended to Marjorie M. Harris, Chairperson, for her diligence and thoroughness in preparation of this first edition.

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*Guide material prepared by 1977-1979 Committee.

WATER ACTIVITY FOR THE HANDICAPPED

JOAN M. MORAN

Dr. Jean Moran, an associate professor at Texas Woman's University, Denton, is currently chairperson-elect of the Texas Association of Health, Physical Education, and Recreation, (adapted and therapeutic section), and chairperson for the Aquatic Council, AAHPERD, for Handicapped Swimming. A graduate of the University of Illinois, she obtained her Ed.D. from the University of Utah. She has recently served as an architectural consultant specializing in swimming facilities for the handicapped in south Texas. Author of Movement Experiences for the Mentally Retarded or Emotionally Disturbed Child, *Dr. Moran has also written many articles on swimming for the handicapped.*

> And he shall stretch forth his
> hands under him, as he that
> swimmeth stretcheth forth
> his hands to swim.
> —Isaiah 25:11

Historical Overview

Historically, exercising in water has been a practice since before the birth of Christ. The ancient Greeks were the first to develop temple baths as healing centers. The Romans modified the Grecian temple baths and created healing centers of great architectural beauty. Both the Greeks and the Romans used naturally occurring hot springs as the water source for their healing centers. Several of these healing centers are still used today for treatment purposes; the most widely known is located in Bath, England.

In the late nineteenth and early twentieth centuries spas began to appear with increasing frequency as treatment centers for individuals with locomotor and rheumatic disorders. Just prior to World War I orthopedic clients were treated at spas, and after the war poliomyelitis patients were included. Such spa exercise was popularized by the late Franklin D. Roosevelt at Warm Springs, Georgia.

Thus, water exercise has progressed from hydrotherapy (chemical and thermotherapy) to therapeutic exercise and is now considered a valuable aspect of rehabilitation. In water, an individual can perform movements with less effort than on land. The buoyancy of the body and its various parts permits seriously weakened body parts to be moved and exercised against the minimum resistance of the water without support. Additionally, when group activity and games are included, the activity benefits individual morale.

Basic Principles of Movement in Water

According to the Archimedean principle, when a body at rest is fully or partially immersed in a liquid it experiences an upward thrust equal to the weight of the liquid it displaces. The relative density or specific gravity of a substance is defined as the ratio of the weight of the substance to the weight of an equal volume of water. The specific gravity of water is 1.0, and the average specific gravity of a body when the lungs are filled with air is approximately .974. Therefore, the average body with air in the lungs will float in water.

The pressure exercised by a fluid at any point on a body immersed in it is equal in all

directions and directly proportional to its depth below the surface. This equal pressure in all directions has no effect on movement.

Viscosity or the property of friction in fluids is low in water when movements are performed at low speeds. Turbulence, however, is set up in the water with increased speed of movement, and large pressure differences arise between the forward moving surface of the body or its limbs and its rear surface.

The effect of buoyancy, therefore, on an almost completely immersed body is great enough to overcome most effects of gravity. Thus, body weight pressure on joints is minimal and movements which are difficult or impossible to perform on land can frequently be executed in the water. One example would be an individual whose weight-bearing joints are unable to support him or her on land being able to walk in water. Additionally, because the forces of gravity and buoyancy almost balance each other, minimum muscle effort is required for slow and gentle limb movements in water.

Special Programming Considerations

All participants in a swimming program for the handicapped should have medical clearance. Medical information should be provided regarding contraindicated movements, medications taken, and emergency contact information.

With few exceptions, activity in water is beneficial to all handicapped individuals. Exceptions would include individuals with infected skin lesions or open wounds, or surgically-made external openings (such as a fenestra in the middle ear) that cannot be adequately or safely sealed.

All participants should empty their bladders before immersion since water often acts as a diuretic. Individuals who have had a colostomy should have the bag emptied before swimming and should wear tight-fitting bathing suits to secure the bag. Those in diapers should have their diapers changed before entering the water and should also wear tight-fitting suits for sanitary purposes.

Participants who are seizure prone should be easily identifiable. If a seizure occurs in the water, the individual's head should be supported above the water level and he or she should be moved to the shallow end of the pool. Under no conditions should the individual be removed from the water until after the seizure. Immediately after the seizure, the individual should be removed from the pool, dried, kept warm, and permitted to rest.

Water activity can be used as pure therapy. Such activity involves stabilizing some joints and moving others as medically prescribed. This type of therapeutic exercise should be performed in warm water to aid relaxation. Even when very minute movements, impossible on land, are performed in water, individual self-confidence and image can be improved.

Muscular strength and range of motion can be improved if a gradual and sequential exercise plan is followed. Such an exercise plan can be assistive, with both support and movement of the various body parts performed by the therapist. Or exercise can be resistive, by using weighted splints on the body parts moved by the individual swimmer.

For many handicapped individuals, water activity can follow a traditional teaching approach that is slow and sequential in nature. Specific strokes should be adapted or modified to rely upon the movement ability and potential of each swimmer. Safety skills should be included.

Water programs for the handicapped, whether therapeutic or traditional, should provide the participant with successful, enjoyable experiences involving socializing with peers. Only those individuals for whom swimming is contraindicated should be excluded from the program.

MAINSTREAMING YOUR AQUATICS PROGRAM

GRACE DEMMERY REYNOLDS

Grace Demmery Reynolds is a member of the National Council of YMCA's Urban Action and Program Division staff. Currently she is director of Project Aquatics Mainstreaming for the Bureau of Education for the Handicapped. Formerly she directed Project Aquatics and served as Director of Special Services for the YMCA of Southwest Washington, Longview, WA. She is editor of the manual A Swimming Program for the Handicapped *and author of numerous professional articles.*

The concept of mainstreaming individuals is not only ethically sound but has been mandated in recent legislation passed by the United States Congress. The process of mainstreaming — whereby individuals interact regardless of age, sex, creed, or ability, and consistent with safety — involves both building the skills of those with special needs and mutual acceptance of both "special" and "normal" people as individuals.

Aquatic activities are ideally suited for mainstreaming. Presently a large number of individuals from both "special" and "normal" populations participate in water activities. Swimming activities are not only fun but they present graded series of challenges, are physically and mentally beneficial and provide opportunities for socialization. In addition to regular program areas there are other more sophisticated aquatic activities in which to participate as skills develop. Such activities include water safety, angling, canoeing, boating, synchronized swimming, water skiing, and skin and scuba diving.

Successful mainstreaming requires a complex educational effort. It is not an immediate product but part of a process with both short- and long-term potential for improving the quality of life for "normal" and "special" people.

Project Aquatics Mainstreaming was planned as a vehicle to bring the benefits of aquatic experiences to all individuals. The project is funded by the Bureau of Education for the Handicapped of the Department of Health, Education and Welfare. The sponsoring agency for the first two years is the Young Men's Christian Association of Southwest Washington at Longview; the third-year sponsor is the National Council of YMCAs. The goals of the project are:

1. To contribute to the growth and development of handicapped children and youth by providing interdisciplinary training or retraining for experienced aquatic personnel in using mainstreaming techniques which will enhance their expertise in achieving integration of normal and handicapped individuals (special populations) in aquatic programs.
2. To provide specialized training and retraining to leadership personnel (educators, administrators, program directors, interested parents, and others) which will increase their abilities to act as innovators and motivators for aquatic mainstreaming.
3. To study and develop a continuum model of mainstreaming through retraining leadership in aquatic programs.
4. To develop, edit, and disseminate materials prepared as a result of field testing new training methods.

Project Aquatics Mainstreaming operates by staging regional and national leadership training workshops for participants who want to initiate and implement programs

which match the particular needs of their communities. Participants in the workshops are selected from applicants on the basis of experience and demonstrated expertise in teaching aquatics and leadership and organizational ability.

Before a community agency can establish a mainstreaming program, certain significant factors must be considered:

1. Are the necessary resources available? The person interested in mainstreaming must have the needed skills or have access to the training needed to acquire them.
2. Is there a process for maintaining the necessary liaison contacts, information exchange, etc.?
3. Do consumers (participants) of both regular and adaptive programs understand mainstreaming and its goals?
4. Does the community know what the purpose of the program is? A good public relations program is vital.
5. Is there good fiscal planning?
6. Is there good communication between staff and directors? The objective of the problem must be explained in terms easily understood.
7. Are attitudes identified and responses given?

Most of these factors are self-explanatory. However, attitude problems which may cause great concern must be dealt with effectively from the start. Problems must be discovered and identified as internal or external.

Internal problems include those involving staff members, resource people, and perhaps administrators, and may be difficult to isolate. Staff members may not be working successfully as a team to implement goals. There may be questions or reservations about the program which people do not discuss comfortably. Perhaps the detractors have instilled doubts or fears. Perhaps the level of idealism with which the program started is diminishing. Those supporting through their resources may have changed their feelings toward the programs. It is important that the director identify indications of change and deal with them quickly and positively as they become obvious.

External attitude problems are more easily identified. These relate to interactions and relations between the program and affected elements of the community, including parents and participants.

It is necessary to maintain objectivity when faced with community criticism. Some negative reactions may be valid and justified and modification of the program to incorporate indicated improvements should be initiated as quickly as possible. Other criticism can best be countered by means of well planned and coordinated public relations. Good communication among all those involved can show what the potential or real problems are.

Changing attitudes may be difficult but can be accomplished. If a problem can be identified and defined in terms both sides understand, realistic solutions could be examined in relationship to available resources. Thus it might be possible to modify the activity to meet the need.

A more subtle approach might be more effective than making abrupt changes. Changing attitudes are normal. As people become more enlightened about the program goals, they may gradually see the value of the activity. If there is a negative response to a mainstreaming program by family members or parents, it might be good to find a neutral ground where program administrators and parents can talk together — perhaps with a good consultant present.

Mainstreaming has become everyone's business. Whether you're dealing with "the least restrictive alternative" or mandates for "integrated programs," you're facing a challenge. Just as awareness is developing on programming for special

populations, we are into the next refinement — good programs for everyone . . . together!

Aquatics is the sensible medium. The equalizing effect of working in water is recognized. Motor and skill development, coordination, and exercise are only a few areas that are known to be effectively addressed in aquatic programs.

It would be naive to expect that the limited life and scope of Project Aquatics Mainstreaming will result in either the optimum model or the training of sufficient individuals to ensure that aquatics mainstreaming will become a reality throughout the nation in the near future. Such a project can, however, serve as a guide and inspiration for communities in initiating and implementing local programs. Aquatics mainstreaming is an effective wedge toward opening the door to mutual acceptance of individuals in all areas of social activity.

Aquatic mainstreaming . . . it's a natural!

ANALYZING SWIMMING MEET RESULTS

DONALD VAN ROSSEN
VIRGINIA VAN ROSSEN

Donald P. Van Rossen is associate professor of physical education and director of aquatics at the University of Oregon in Eugene. He has coached swimming and diving for 27 years and is past chairperson of the Aquatics Council of AAHPER and the NCAA Swimming and Diving Rules Committee. He is currently editor-secretary for the NCAA Swimming and Diving Guide and Committee. Virginia A. Van Rossen is women's coach and instructor of physical education at the University of Oregon in Eugene. She has coached swimming for 20 years at the AAU and collegiate levels. She is past chairperson of the Aquatics Council of AAHPER and past editor of "Aquatics Briefs" for JOHPER.

More valuable information can be derived from meet results analysis than typically is reported. The present approach deals with times, places, scores, and records that limit not only the amount of statistical data available, but also the volume of news reporting about competitive swimming. This limitation has stunted the potential for making objective assessments of training, individual and team progress and performance, race planning, meet strategy, and the physical and mental preparation of the swimmers.

The feedback of information from statistical compilation is becoming one of the most important coaching tools available. The information received indicates the direction in which the season is progressing and serves as a gauge by which future performances may be predicted. Using such data becomes invaluable for long-range planning and goal setting.

Swimming statistics can detail box scores, percentiles, personal bests, etc., as other sports do. Such data are more comprehensible to the news media and of greater interest to the public. For example, the number of swims (*S*) corresponds to baseball's number of times at bat (*ab*) and a swimmer's season's best (*SB*) compares with a baseball player's number of hits (*h*). A batting average is calculated from *ab* and *h*, as the percentage of improvement (*PI*) can be obtained from the *SB* and *S* in swimming. These are important statistics not only to the coach and athlete but to the public as well and the more information available concerning a sport, the more newsworthy the competitive event.

The following is a system for compiling meet results including tabulation forms and suggestions for drawing conclusions from an analysis of the findings. The proposed system, forms, and methods have been developed through trial and error and are still being tested.

Tabulating Dual Meet Results

Individual Statistics

There are a number of factors or variables indicating the quality of a swim that need to be tabulated and organized to provide information for meet analysis. These include the number of swims (*S*), season's best times (*SB*), personal best times (*PB*), first place wins (*W*), earned points (*EP* or *Pts*), pool, meet, varsity and regional records

(*PR, MR, VR, RR*), and percentage of improvement (*PI*). The following figure is a sample of a meet tabulation form for individuals. (Figure 1.)

SWIMMING MEET TABULATION SUMMARY

University of Oregon vs. _____

Place _____ Date _____ Score: UO _____

Name	Swims	SB	PB	W	Nat'l. Qual. (NQ)	Type of Record	PI

Figure 1.

It is also necessary to make an on-the-spot identification of season's best (*SB*) and personal best (*PB*) and a listing of the various records. For both of these statistics, a form should be developed prior to competition. The *SB* and *PB* forms should be included on one page with the current listing of all team members and events. The record summary form can be distributed to meet officials, announcers, score keepers, swimmers, coaches, and news media prior to the meet. Therefore, as a record is broken or *NQ* is met, the event can be circled and the name or names and times can be entered immediately. Examples of these forms are presented in Figure 2 and Figure 3.

SEASON'S BEST TIMES

Names	FREE					BACK			BREAST			FLY		IM			
	50	100	200	500	1650	50	100	200	50	100	200	50	100	200	200	100	400
	DATE SCORE *		DATE SCORE *		DATE SCORE *												

* – Varsity Record ◎ – National Qual Time + – Personal Best

Figure 2.

SWIMMING MEET RECORDS SUMMARY FORM

University of Oregon vs. _____

Place _____ Date _____ Score: UO _____

Event	Pool	Varsity	Meet	Regional	Nat'l. Qual.	Name	Time

Figure 3.

Another very useful record is a list of the "All Time Top Ten" — a roster in order of rank of the ten fastest individuals for every event in the team's history. A form for this can be developed that would include name, year, and time.

Another factor of importance in meet analysis is the recording of splits for each swimmer. A temporary form is often used for gathering the data which can later be transferred to a permanent record form. In races up to 200 meters or yards the time is generally recorded in quarters or halves of the distance covered — 25, 50, 75, 100 or 50, 100, 150, 200. Times indicate information representative of that swim.

Team Statistics

The factors in recording team statistics include score, total number of records, number of first place wins, and national qualifiers. Records should also include the total number of swims, season and personal bests, as well as the win-loss record. Most of the information can be taken from individual statistics although some coaches may want to tabulate team data separately. The following form is a sample for tabulating team statistics. (Figure 4.)

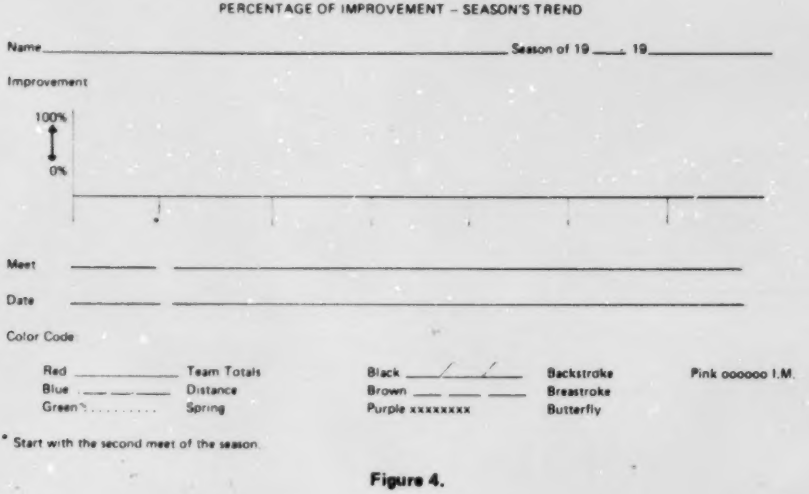

Figure 4.

Tabulating Championship Results

Individual Statistics

The variables tabulated in championship competition are the same for each session as tabulated in dual meets: *SB, PB, VR, MR, RR, NQ,* etc. However, the form is expanded to include summary and comparison between prelims and finals, first, second, and third days, and between strokes and distances. A sample of an individual championship tabulation summary for first, second, and third day comparisons follows. (Figure 5.)

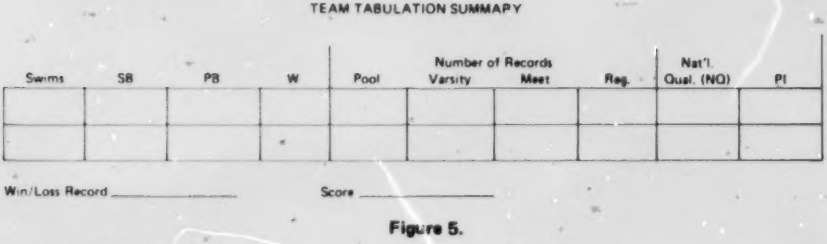

Figure 5.

Team Statistics

The variables tabulated in team competition include the total number of swims, *SB*s, *PB*s, records, and *NQ*, as well as the number of first places, points earned, and events. Also included should be a breakdown or summary of the number of swims

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each day and the number of season's bests each session. Prelim scores should be compared with finals, and first day with third day. *PI* can also be determined between strokes and distances. Three forms follow showing how to tabulate this information. (Figure 6; Figure 7; & Figure 8.)

CHAMPIONSHIP MEET SUMMARY

Meet _____ Place _____

Date _____ Score _____ _____ _____ _____ _____

		1st Day				2nd Day				3rd Day			
Name		Swims	SB	PB	PI	Swims	SB	PB	PI	Swims	SB	PB	PI
	P												
	F												

Figure 6.

PERCENTAGE OF IMPROVED SEASON'S BEST SWIM BY DAYS

	1st Day			2nd Day			3rd Day			Totals		
	S	SB	PI	S	SB	PI	S	SB	PI	S	SB	PI
Prelims												
Finals												
Totals												

Figure 7.

PERCENTAGE OF IMPROVED SEASON'S BEST SWIMS BY STROKE AND DISTANCE

	Freestyle			Backstroke			Breaststroke			Butterfly			
	S	SB	PI	S	SB	PI	S	SB	PI	S	SB	PI	PI – Totals
50													
100													
200													
Total													

Figure 8.

A Systematic Analysis of Meet Results

Individual Performances

The most popular analysis of individual performance is to use split times as indicators of the success of the race plan by comparing each race with previous swims. Three important variables indicated through assessment of splits are (a) the speed going out for the first fourth and/or half of the race, (b) the speed coming back in the last fourth and/or half of the race, and (c) the drop-off time between the first and last half of the race.

An analysis of the splits can give coaches and swimmers insights into the effectiveness of race plans, consistency of pace, and effectiveness of training and

conditioning programs. Trends and progress of the individual are plotted for future motivational objectives and goalsetting.

Percentage of improvement (*PI*) is found by dividing the number of season's best* by the number of swims. Improvement seems to be a more positive indicator of the progress of an individual and can reinforce motivation and goal setting. It is possible to plot a total meet *PI* for each swimmer for the entire season. A sample of a *PI* chart follows. (Figure 9.)

PERCENTAGE OF IMPROVED SWIMS FROM PRELIMS TO FINALS

	Freestyle			Backstroke			Breaststroke			Butterfly			
	S	SB	PI	S	SB	PI	S	SB	PI	S	SB	PI	PI – Totals
50													
100													
200													
Total													

Figure 9.

The number of first places scored, points earned, season's and personal bests achieved, new records broken, and national qualifying standards met are all indicators of high quality swims. Summarizing these kinds of swims can give insight into the psychological preparation of the individual for the meet and can determine who rises to the competition consistently and who saves until the big event. Data can also indicate the effectiveness of training and taper programs. There are many hidden variables that may be hard to discern, but the general trends will become visible.

Team Performance

The team's percentage of improvement can be analyzed to determine many factors. The level of training fatigue, the importance placed upon the meet by the athletes, and the effects of training procedures may be indicated. Normally, an average of 50% improvement can be anticipated in a good competitive meet.

The same chart (Figure 9) used for the individual percentage of improvement can be used for the team by totaling the data and charting the average. Color coding can simplify the procedure by allowing all information to be illustrated on one graph. From such a graph it is possible to determine the effectiveness of the total swimming program in all of the strokes as well as at the various distances. The information can point out weaknesses as well.

The number and rank order of individuals achieving listing in an "ALL TIME TOP TEN" roster, along with the total number of new records and national qualifiers, is a good indicator of the quality and progress or growth of a team. This information is a valuable administrative tool for budget allocation and recruiting. This summary report can also be used for competition reports, award programs, yearbooks, and for the sports information office.

Championship Meet Statistics Analysis

Too often a team comes away from a championship meet frustrated and dis-

*An event swum for the first time that season would be the initial season's best.

appointed in its performance. All the training and work for the whole season is aimed at the championship event in which everyone hopes to excel. However, if the championship meet statistics are thoroughly analyzed, the opposite is often true.

In the 1978 AIAW large college championships at Duke University, only 13 out of 47 women in the 100-yard freestyle equaled or improved their entry time for a total *PI* of 27.65%. The best performance was in the 1,650-yard, where 14 out of 20 women equaled or improved their entry time for a *PI* of 70%. From a total of 884 swims, only 415 swims were equaled to or better than the entered time, for a grand total of 46.94% of improvement.

In the 1978 Men's Division I NCAA Championships at Long Beach, statistics showed the men did not perform as well as the women: Only 169 out of 607 swims were equal to or better than entry times, resulting in a *PI* of 27.84%. Knowing these trends can help alleviate disappointment with a championship meet or at least give the meet a realistic perspective.

Statistics can also indicate the success of the meet, realistic time standards, and feasibility of meet sites. The data is newsworthy in that it describes the intensity of competition and the directions and trends toward which competitive swimming is moving.

Summary

A calculator should be almost as valuable to the coach as a stop watch and a system of computing meet results as important as having a team roster. The computing method is important in three ways. First, the forms and procedures for use both during competition and for permanent record should be as simple as possible. Secondly, the information gathered must be used in making decisions concerning training, taper, entries, race plans, meet strategy, etc. Finally, if your record-keeping is thorough, you can enjoy the feeling of being organized and knowledgeable about your swimmers and your program.

DETAILS IN POOL PLANNING

DAVID G. THOMAS

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A speech to the Facilities Council at the 1976 AAHPER National Convention was entitled "Pool Mistakes You Wouldn't Believe." The reaction to the speech made it clear that an article on the often overlooked details in pool planning is needed.

Dimensions

Metrics are coming, but the transition in swimming pools will be slow. The best of both the metric and the U.S. measurement systems can be used by planning a pool with a movable bulkhead. In addition, the spiraling cost of construction mandates that a new pool must be made as versatile as possible. A single pool can be made to serve an extremely varied program if it is planned properly. The pool shown in the diagram on page 29 is designed for maximum flexibility. Each feature was included for a specific purpose.

The pool is 121 feet long and 45 feet wide. The width allows six standard competitive swimming lanes of 7 feet each, with the highly desirable "outside alley" of 18 inches. The 45-foot width is the minimum allowed by water polo rules and is also the distance specified for beginning swimmers to swim and return under the Red Cross system.

The length allows for a movable bulkhead, 4 feet wide, to be positioned at the 25-meter mark and still provides a minimum of 35 feet for a safe diving well. A shorter pool would not be safe enough for diving during a metric swim meet unless the bulkhead was moved. The pool length makes possible a minimum length, official water polo area with the required depth of 6 feet and provides a shallow water instruction area of adequate dimensions (42′ × 45′) with the bulkhead forming a physical barrier between shallow and deep water.

The minimum depth of 3 feet 9 inches is a compromise between recommended competitive course depth (4 feet) and a desirable depth for teaching young children. Three feet 9 inches exceeds the minimum depth allowed by competitive swimming rules and has been quite satisfactory in actual use. A depth of 4 feet 6 inches at the deep end of the training area is ample depth for training both beginning and advanced swimmers, but is not too deep for shorter adults who are unable to stand comfortably in 5-foot depths. A sharp drop in bottom contour at that point is necessary to provide a depth of more than 6 feet on the outer side of the bulkhead to comply with water polo rules. This sharp increase in depth is also helpful in providing as much deep area as possible for synchronized swimmers who cannot perform adequately in less than 8 feet of water. The sharp drop to 8 feet is not dangerous because it can be protected either by the bulkhead or a lifeline across the pool.

From an 8-foot depth, the bottom slopes evenly to a maximum depth of 15 feet. Though safety rules for 3-meter diving require a minimum of 13 feet, it is safer for divers and better for scuba classes to have the 15-foot depth. In addition, a 15-foot depth would be adequate for platform diving up to a height of 7.5 meters if desired.

The depth at the deep-end wall is 13 feet for diving safety, and the slight downward slope aids in working bottom dirt to the drains for a cleaner pool.

The bulkhead is 4 feet wide and 3 feet 8 inches deep. The width is sufficient for swimming meet officials and lap counters to share without crowding. It also allows lifeguards a pathway for crossing the pool when necessary. The bulkhead is deep enough to comply with competitive swimming rules for turning surfaces but shallow enough to be positioned at the shallow end of the pool during water shows or sailing or canoeing classes. Because it can be positioned at any point in the pool, the bulkhead may also be used as a platform from which overhead lights may be serviced.

Bulkhead Anchors

Secure, positive anchors for the bulkhead should be provided at specifically designated points. The bulkhead could be temporarily positioned at any other point by blocking the wheels or by decreasing flotation to hold it.

Positive anchors should be provided with the bulkhead just 1 inch from the shallow-end and deep-end walls. The 1 inch is necessary to prevent damage to the tile walls, yet not allow feet or arms to be caught in the crevice. Positive anchors should also be provided at the position where the deep-side face of the bulkhead is exactly 75 feet from the deep-end wall. This position provides an official water polo course and a physical barrier between the shallow and deep water areas.

Positive bulkhead anchors for competitive swimming courses must be provided for two positions. The first is with the shallow-side face of the bulkhead *exactly* 75 feet 1 inch from the shallow end and the second with the shallow-side face of the bulkhead *exactly* 82 feet, 1.5 inches (25 meters, plus 1 inch or 2.54 centimeters) from the shallow end. The extra inch is necessary to ensure that the racecourse is not shorter than the specified distance due to inaccuracies in the construction of the pool wall, and to allow touch pads for electronic timing mechanisms to be inserted at the finish without making the racing distance shorter than prescribed. When a new record is established, a registered engineer must measure the actual distance swum, to the smallest fraction of an inch, and submit a report with the record application. For this same reason, the bulkhead must be rigid enough that, when pulled by tight lane lines, it does not bow in the middle to shorten the racecourse.

Bulkhead positions are shown in the drawing by dotted lines and broken cross-hatched areas. The complete bulkhead as shown is in the 25-meter competitive position, which will probably be its normal position for recreational swim periods.

Deck Sockets

Deck sockets to accept stainless steel posts of no less than 2 inches overall dimension should be placed as shown by black dots in the drawing. They should be on each side of the pool so that a line may be strung across the pool between posts.

Measuring from the shallow-end wall, the first pair of sockets should be at 15 feet. This position is required by the competitive rules for placement of backstroke turn flags. The second location should be at the 36-foot mark. Competitive swim rules require a "recall line" at this point to signal false starts. Sockets are highly desirable at the 42-foot mark so that a lifeline can be strung across the pool as the demarcation point between shallow and deep water when the bulkhead is not used. It is desirable to

have post sockets at this point even though water level inserts are installed for a lifeline as in most pools. There are times when a lifeline at a height of 6 inches or 1 foot above the water would be desirable as an additional warning, or to limit the range of a large ball sometimes used in games for shallow water swimmers. Deck sockets are also needed at the 60-foot mark and at the 67-foot mark to provide backstroke turn flags for the 25-yard and the 25-meter competitive courses, respectively. It is suggested that sockets at the 25-yard and 25-meter distances might also be useful for games, though they are not necessary. All these sockets should be about 12 to 18 inches from the pool edge.

The stainless steel posts for the sockets should be in three sections which fit together with sturdy inserts designed to withstand considerable pull from the side. The first section should extend about 1 foot above the deck level to be used when a line is extended at water level for games or for safety. The second section should raise the post about 4 feet above water level. This section also would be used for games or safety. The third section should extend to 7 feet above water level to provide backstroke turn flags in conformance with competitive rules. The lateral strain on such posts is considerable, and preferably anchors should be bolted completely through the deck into a metal plate in the crawl space below. Six posts will be needed simultaneously during speed swimming meets.

Filtered Water Inlets

The filtered water inlets to the pool should all be of the adjustable flow type for proper control of the recirculation pattern. They *must* be of the type which can be mounted exactly flush with the pool side walls. The inlets shown by small squares in the drawing are mounted 18 inches below the water surface and spaced every 15 feet around the pool perimeter, except on the shallow-end wall. The spacing and depth may vary at the engineer's discretion, but there can be no variation in the placement of the inlets in the shallow-end wall. It would be best to have no inlets at all on the shallow-end wall, but if they are required by the local health department code, they *must* be placed *directly* under the lane line anchor sockets and as close to the bottom as possible. This point is often overlooked in pool planning and is necessary to avoid problems in competitive speed swimming.

Underwater Lights

Underwater lights are shown in the drawing by small circles on the side- and deep-end walls. It is suggested that they be spaced every 7 feet around the pool perimeter, except that they must *never* be placed in the shallow-end wall. It is further suggested that they be mounted 18 inches above the bottom in shallow water, and not more than 30 inches above the bottom in deep water. Keeping the lights low in the pool subjects them to greater water pressure, but gives better illumination and increases pool safety by eliminating the "light plane" which makes it impossible to see submerged swimmers at night from some viewing angles. It is important that the lights on each side wall, and especially the lights on the deep-end wall, be on separate switches. Frequently, the deep-end wall lights will be turned off during competitive swim meets to avoid blinding the swimmers as they come to the bulkhead for a turn.

If the lights are evenly spaced as shown, they can be wired to a sequential timer and can be used as a pacing mechanism to aid in training distance swimmers. The timer mechanism must be complex to allow for timing either 25-meter or 25-yard courses, and for pauses at the turns. The timer should be designed in consultation with a knowledgeable swimming coach.

To avoid the danger of flooding in the event of a cracked lens it is best to use wet-niche lights. These lights are more trouble to service than dry-niche lights, but are safer in the event of contact with a scuba tank.

Lights in the shallow-end wall are a hazard. They blind the competitive swimmer and may be broken by swimmers as they turn and kick off from the wall.

Underwater Loudspeakers

Experience has shown that underwater loudspeakers are almost a necessity in modern pools. They are extremely valuable in teaching scuba classes and indispensable in synchronized swimming. It is best not to build them into the pool walls because of the deterioration due to chemical action. One solution is to build speaker jacks into the side wall of the natatorium about 6 inches above deck level. Speakers can then be plugged in and hung over the pool edge during use, and stored on a small wheeled cart when not needed. Speaker jack locations, shown on the drawing by small triangles, should *not* be located directly across from each other, but should be staggered down the length of the pool to avoid sound interference that might cancel the signal underwater in mid-pool. Eight jacks are suggested for a pool of this size if University underwater speakers are used. Use of the Lubell speaker could reduce the number needed to three. It is vital that these speakers be wired so that sound can be heard either underwater alone, or underwater and overhead simultaneously. It is best to place a variable resistor in the overhead speaker line so that when the volume is high to the underwater speakers, the resistor can lower the volume of the overhead speakers.

Microphone Jacks

Microphone jacks are shown on the drawing as small half-circles at the perimeter walls of the natatorium. Note that there should be a jack in each end wall and at least two along each side wall. In addition, it is very important to install a microphone jack adjacent to each underwater window for instructional use.

Underwater Windows

Underwater windows are a very valuable aid to instruction. Swimming, lifesaving, synchronized swimming, diving, and scuba classes all benefit from a properly designed underwater window. Unfortunately, until recently, lack of access to the windows has made them practically useless. It is *vital* that they be immediately and directly accessible from the pool deck. The drawing shows trapdoor access stairs built into the pool deck between the diving boards and along the pool side. In addition, if these "viewing rooms" are small, completely enclosed concrete areas, the danger of flooding the entire lower area if a window breaks is eliminated. Each viewing room should be equipped with a microphone jack to the underwater and overhead speakers and should contain a video camera jack so that a video camera can be mounted at the window and action viewed on a monitor on the pool deck.

The windows should be no less than 2 feet by 4 feet in size, but 3 feet by 6 feet would be much better. They must be mounted so the top of the window is deeper than 4 feet, and 10 to 20 feet away from a corner. The windows shown in the drawing of the pool walls are 2 feet by 4 feet and 2 feet by 6 feet, respectively. The deep-end window is 5 feet below the surface and centered between two diving boards. The window on the side wall is 6 feet below the surface and 20 feet from the deep-end wall.

The trapdoors leading from the deck to the windows should be of aluminum, not steel, and must have a non-skid surface. They should be mounted flush with the pool

deck and should be hinged so they provide their own barrier on each side of the steps when open. The viewing room *must* be provided with a floor drain.

Pool Markings

Competitive swimming lane markers should be set in black tile in a white pool bottom. No other color should be considered. Competitive rule books specify that they should be 12 inches in width and have turn targets at each end. Consult the AAU and NCAA swimming rule books for details. In a pool 45 feet wide (such as the one shown here) the outside lane markers must be centered 5 feet from each side; the others are 7 feet apart on centers. Some modification in the lane markers is needed in this particular pool to allow for either 25-yard or 25-meter distance swimming. Assuming that the primary use will be for the 25-meter course, the turn targets for this distance are marked by a solid line across the pool bottom centered 5½ feet away from the end of the course. At the bulkhead end a 3-foot cross is provided at the same distance from the bulkhead as it would be placed for the 25-yard course (centered 7 feet from the center of the solid crossline). If the primary course is to be the 25-yard course, then the solid line and short crossline should be reversed. The turn targets on the pool bottom should *not* be identical for both courses. This would lead to confusion for the swimmer.

Sockets for attachment of lane floatlines should be inset into the shallow-end pool wall and the shallow-side face of the bulkhead. There should be no part of the socket protruding beyond the face of the wall. Sockets should be very sturdily mounted to withstand considerable pull when tightening the floatlines. All sockets should be installed as close to water level as possible, preferably within an inch above the surface.

In a 45-foot pool, as shown, the floatline sockets should be installed 18 inches from each side wall, and on 7-foot centers thereafter. Lane floatlines should be equipped with easily adjustable winches at one end and should be made of plastic-covered stainless steel cable. Floats designed for wave-quelling action are essential.

Water polo court markings should consist of a 2-inch black line extending only 1 foot below the water surface and up to the top lip of the deck. Only a 1-inch black mark, 6 inches long, should be installed in the horizontal pool deck at the lip of the pool. It would be desirable, however, to install permanent deck sockets to accept a one-half-inch steel rod as close to the edge of the pool as possible.

Water polo markings are shown in the drawing by short lines directly at the pool edge. In a 25-yard court, such as the one shown, they should be placed on each side of the pool at the following distances from the deep end of the pool: 18 inches, 7½ feet, 13½ feet, 37½ feet, 61½ feet, 67½ feet, and 73½ feet.

Sockets for insertion of water polo goal standards must be provided in the deck at the deep end and in the top surface of the bulkhead. Size and placement will vary according to the brand name of the goal net purchased. The decision on goal net should be made in time to build the sockets into the deck and bulkhead at the time of construction.

Ladders

Pool ladders should be recessed into the pool side wall near the corners. They should not be placed in the end walls. Ladder handrails should be placed so that no part of them protrudes beyond the pool deck over the water.

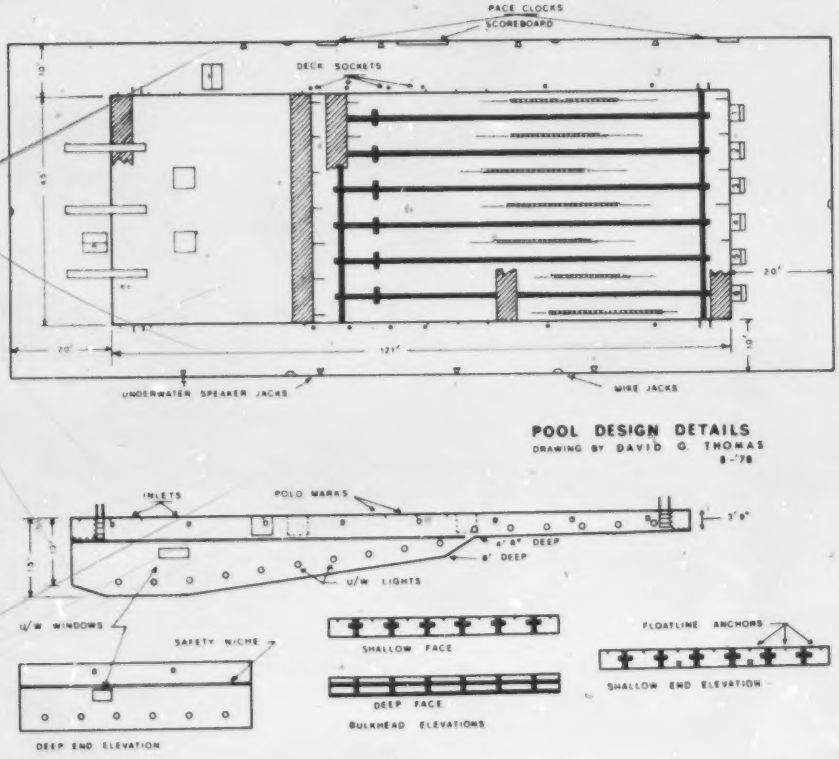
Pace Clocks

Pace clocks 3 or 4 feet in diameter should be mounted on the natatorium wall at each end of the competitive course as shown in the drawing. The clock at the deep end of the course should be centered between the end of the 25-yard course and the end of the 25-meter course. If spectator seating or overhead balconies make it impossible to mount clocks at a height 5 to 7 feet above the deck, then portable clocks should be used on the deck. Clocks need to be on one side of the pool only.

Safety Niche

To provide a foothold for resting in deep water, a niche in the pool wall is recommended. The one shown in the drawing extends across the deep end wall and along each side wall to the 6-foot depth point. It is recessed 6 inches into the wall and is 6 inches high. The bottom edge of the niche is 4½ feet deep. The corners should be coved for safety and ease of cleaning. A protruding ledge is a hazard and should not be used.

Many of the items mentioned in this article are overlooked frequently in planning pools. Foresight in planning these details would result in far less material for speeches such as "Pool Mistakes You Wouldn't Believe."



TIPS FOR BOATING EDUCATION

BEATRICE A. PYLE

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Emphasis in physical education activities is directed toward the lifetime sports of bowling, golf, tennis, and swimming. Rarely is the area of small craft indicated in this category, although in 5 to 10 years water-related sports are expected to be the most popular recreational activity in the country. It is the opinion of the Aquatic Council of AAHPERD that activities involving small craft will account for much of this rise in popularity.

As the use of small craft increases, safe boating practices are needed. Ignorance of equipment, regulations covering boating safety, and lack of consideration for others have led to a high accident rate. In an effort to reduce this statistic the United States Coast Guard sponsors an annual Boating Education Seminar. AAHPERD has been represented at all seminars and is cooperating with the Coast Guard in the preparation of professional educators in this discipline. Safe boating can only be achieved through a captive audience over a period of growth years. This audience can be found in the physical education classes throughout the land. Physical education personnel trained in the methods of teaching small craft activities at all levels can and are serving, not only their students, but the community and the nation.

The ideal time for small craft education is early in physical education instruction, making students and parents receptive to boating safety. Rowboating, canoeing, kayaking, sailing, and power boating are rich in the psychological, physiological, and biomechanical benefits offered in the physical education domain. A small craft course can be taught in the gym, classroom, pool, or lake to all age levels — grades K to 12, college and university students, and senior citizens.

The administration of a small craft course is not as insurmountable as one would imagine. Basic areas can be taught without even launching a boat in water. Theory encompasses a large percentage of the course, and it is this knowledge that is generally lacking in present-day enthusiasts. Ideally a good course encompasses both theory and practical techniques, but the absence of facilities should not preclude offering such instruction.

Types of Courses: Rowboat, Canoe, Kayak, Sail, Powerboat

1. Theory courses when there are no boats or water areas available and when students are under age according to state law.
2. Theory and practical courses when boats and water are available.

Cost

The cost will vary from place to place but need not be prohibitive. Cost depends on availability of boats and a place to use them as well as the ingenuity of the instructor. It is always possible to borrow a small boat somewhere in any city, village, or outlying area. Small sailboats such as the cat rig or board boat with lateen rig, a canoe 12-18

feet in length, or a small dinghy with oars, are all light enough to be placed in a swimming pool or on a gymnasium floor on inflated inner tubes. Community agencies such as recreation departments, Red Cross, scout groups, police departments or even community leaders might provide boats. The Bureau of Water Safety or Natural Resources in each state is an excellent source for assistance and instruction. Frequently "package deals" can be made with marinas or parks where there is a boat dock or renting concession.

The Instructor

If an instructor is not knowledgeable or feels insecure in attempting a course many avenues of assistance are open in the form of films, slides, posters, and booklets from various agencies. Groups such as the Red Cross, Coast Guard, United States Canoeing Association, or Outboard Boating Club of America as well as interested community members can be of great assistance.

The Student

All students should have theory instruction (regardless of age) and those with swimming ability should have theory-practical (on water) experience.

General Tips

Instruction in the Classroom, Field, or Gym

Place a canoe, rowboat, small dinghy with a small motor, or sailboat (board boat) on four inner tubes. (This creates the sensation of being on the water.)

A. Techniques
   1. Proper placement of equipment required by law
   2. Entering and leaving the craft and changing positions
   3. Carrying the craft
   4. Trimming the craft
   5. Canoeing — position and essential strokes (use brooms for paddles). Bleachers or stairwells can also be used.
   6. Sailing — (do not use daggerboard or rudder). Students rig boat, raise and lower sail, change positions. Using several large mobile fans directed towards the sail, teach students how to handle the sail with wind coming from different directions.
   7. Rowboat — use brooms for oars

B. Navigation — chart reading and application of compass
   1. Use of local map; shrubs and trees are reefs or rocks; street corners are islands or docks. Instructor puts in buoys.
   2. Use orienteering on land to teach navigation on water.

C. Marlinspike Seamanship — each student makes a knot board with explanation and use of each knot.

D. Weather — trip to weather bureau or local forecaster as a guest speaker.

E. Rules of the Road and Piloting
   Problem-solving situations using gymnasium or field as water. Set up buoys (road markers or flags for buoys . . . on water, styrofoam protectors that chemicals are shipped in make good buoys). Students walk through situations pretending they are boats.

F. Safety (films available)
   1. Proper use of personal flotation devices
   2. Causes of accidents
   3. Boat safety
   4. Care of equipment

Instruction in Swimming Pool

This instruction would be followed by practical work on a safe body of water. Techniques learned with craft on land (inner tubes) can be carried into the pool using the same boat (without the tubes). Additional techniques are listed.

A. Canoe
   1. Launching from land — entering, cruising, debarking
   2. Strokes — kneel on deck and paddle in water followed by paddling in canoe
   3. "In and Out" while on water
   4. Capsize recovery
   5. Canoe over canoe rescue — use board boat or dinghy

B. Sailboat
   1. Launching and docking
   2. "In and Out" techniques while on water
   3. Capsize and righting
   4. Daggerboard as paddle

C. Rowboat
   1. Launching, rowing, and docking
   2. Proper use of oars
   3. Capsize techniques

TEACHING AQUATICS TO INFANTS

CARLA J. SEVERSON

Carla J. Severson is aquatics instructor for the Madison Recreation Department in Madison, Wisconsin. She has presented infant swimming materials at the National Forum for the Advancement of Aquatics and has established swimming programs for infants and developmentally disabled children in Wisconsin and Florida.

With a growing public interest in preschool aquatic programs, there are too few resources available to teachers hoping to establish a program in their community. This article is designed to provide the groundwork for setting up an infant aquatic program. It will cover facilities, staffing, registration, publicity, orientation, class organization, and teaching techniques.

Before any classes can start, it is important to be sure adequate facilities will be provided. The ideal situation is an indoor pool with a water temperature between 87° and 92° F. The air temperature should be 3-5° F warmer. The water temperature is one of the most important factors in an infant aquatics program. A cold baby will be a miserable baby. Dressing rooms with changing tables and warm showers should be available. Depending on the particular teaching techniques employed, teaching aids such as water toys and flotation devices may be used. Water toys can include any plastic waterproof bathtub toys. They should contain no parts small enough to fit into a baby's mouth. Many feel that using toys as teaching aids can be distracting to the child. However, used effectively, they provide an avenue for positive reinforcement and offer an incentive.

Flotation devices, most commonly inflatable arm bands and float belts, are sometimes implemented as teaching aids. Many instructors are urged to use them in programs where teaching with flotation devices is stressed. It is probably most effective to use these for only part of the lesson, if at all. The children can easily develop a dependence and false sense of security with such devices.

Before starting a preschool swim program, every pool should be equipped for greatest safety. There should be a telephone with emergency numbers nearby. An adequate first aid kit is necessary. Doors and locks to the pool should be secure. Non-slip tile in the locker room and around the pool deck is important. The pool area must have the proper lifesaving equipment.

After establishing facilities, it is necessary to consider staffing. It is best to have one instructor for every ten children. Though it may be difficult to find instructors trained in infant aquatics, it is best to employ water safety instructors with previous teaching experience. One or more attendants should be employed to supervise the deck and locker room area.

Publicity is helpful when starting a new program. Some effective avenues for publicizing your program are newspapers, radio and television spots, brochures and flyers to maternity wards, La Leche Leagues, and day-care centers. Of course, the best form of advertisement will be word of mouth, once a program is established.

An orientation session is important for new participants. This gives the instructor an opportunity to cover significant points with the parents. These should include:

a. what the parents can probably expect from their children in the water,
b. what will be covered in the ten-lesson session,

c. what the parent and child should wear, and
d. what parents and children should do in preparation for the lessons.

Basic rescue and resuscitation techniques can also be included at this time.

Children should be grouped according to both age and ability level. One-year increments are a suitable division. Ability level can be judged in terms of experience in the program or by swimming ability.

The children should attend lessons 2-3 times each week. The lessons should be no more than one-half hour in length. At this age frequency is more important than endurance in learning.

In terms of safety and development, the following skills should be included in a preschool aquatics program:

a. Submersion
b. Hanging on to the side of the pool
c. Climbing out of the pool
d. Jumping in
e. Backfloat
f. Techniques for arm pull and kick
g. Passing the child underwater
h. Coming up for a breath while swimming in a prone position
j. Jumping in, turning around, and swimming back to the side

Included with these skills should be games and play activities which either the instructor or parent can introduce.

It should be made clear to the parents that they will be instructing and working with their own children: They will be taught skills to help their children become more secure in water. Clear up unreasonable expectations by explaining that the child will not learn "swimming" skills and will not be independent in the water after ten lessons. The instructor will teach effective techniques and provide assistance. Parents should be reminded that liberal use of praise and patience will aid learning.

The following curriculum outline includes all that should be covered in a ten-lesson course. This provides the parents with enough material to work independently with their children until they are about three years old.

TEN-LESSON FORMAT

Lesson I

a. Locker room and pool rules before entering the water
b. Techniques for adjustment to the water
c. Beginning kicking exercise

Lesson II — First submersion

Lesson III

a. Hanging on to the side
b. Climbing out of the pool
c. Jumping in — sitting and standing, assisted and unassisted

Lesson IV — Backfloat

Lesson V — Passing the child underwater:

a. From teacher to parent
b. From parent to side of the pool
c. From parent to self — while moving backward
d. Child swimming from wall to parent

Lesson VI — Arm pulling techniques

Lesson VII

a. Review self-pass from Lesson V — coming up for a breath
b. Stress importance in learning independent rhythmic breathing
c. Teach turning over from front to back

Lesson VIII

Advanced combined skill — jumping in, turning around, and swimming back to the side

Lesson IX — Practice and review

Lesson X — Practice and review

The following time division can be used for each class:

a. 5 min. — Taking roll and answering questions
b. 5-7 min. — Warm-up and practice
c. 7-10 min. — New skills
d. 10 min. — Practice and playtime

This article has covered the basic material needed when organizing and teaching an infant aquatics program. Supplemental materials are listed in the bibliography. The primary aid in running this kind of program comes through experience.

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USE OF THE "STANDING FLOAT" IN LEARNING TO TREAD WATER

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Beginning swimmers often defeat their own purposes in their early efforts to learn to tread water. Their furiously flapping arms and thrashing legs contribute as much to submergence as they do to support and are a poor substitute for reliance on the buoyancy of water and on efficient sculling and kicking. Even experienced swimmers waste energy in their efforts to keep head and face above water. If beginners and all other swimmers can be helped to discover the full effect of buoyancy in deep water, they can learn to depend more upon that buoyancy, replace unnecessarily vigorous movement with slower, less taxing action, and thereby extend their endurance time while treading.

One method that successfully affords the buoyancy experience is a "standing float" in deep water. The standing float is performed by assuming a vertical, "standing" position in deep water, stopping all supportive movements, and permitting the body to settle at whatever depth individual body density dictates. The experienced swimmer can begin this float from treading water by slowing, then stopping, the treading action and catching a quick breath just before the mouth is submerged. The non-fearful, novice swimmer can support the body by placing one or both hands on the overflow edge, allowing his or her body to settle into the water, and then removing the hand(s) from the pool edge. The beginner and/or fearful novice can be supported under one arm (or by a suit strap) by a partner who then lowers the floater into the water.

From a vertical position, with the chin at water level, the swimmer should quickly but gently stop all efforts to stay above water. There should be no final upward surge as support efforts are stopped. The swimmer will then slide downward some distance into the water. The swimmer whose body density is greater than 1.0 will not return to the surface without some supportive effort but will settle toward the bottom. All others will bob gently and repeatedly until each finds the depth of suspension determined by individual body density and the amount of air in the lungs. During this quiet bobbing process the head should be held erect with eyes directed straight ahead parallel to the surface of the water; the arms should hang at the sides and the legs should hang straight down as though standing. Balance in the vertical position can be maintained by keeping the head erect and moving the arms gently forward or backward to counter any tilt of the body. Except for the low level of tension required to maintain body balance and alignment, the student should remain relaxed during the standing float. Two or three attempts may be required for some students to achieve a fully suspended position.

As pointed out above, students with body density greater than 1.0 will not be suspended but will sink to or near the bottom and remain there until some effort is made to return to the surface. Among those who sink will be a higher percentage of adult males than adult females and a higher percentage of blacks than whites, but in any mixed, average class there will be a very small number of true "sinkers." Some swimmers with body density near 1.0, especially men and firmly muscled, lean women, will settle completely under water but not on the bottom. Most students will be suspended with some part of the head above the water's surface; many, especially adult women, will be so high that their eyes will be above water. Occasionally an obese swimmer with soft musculature will float with the head entirely above water.

Those who float high will soon discover that a simple backward tilt of the head will enable them to clear water long enough for a quick exchange of air. Those who float slightly lower will be required to press downward with the hands while tilting the head back in order to clear the surface for breathing. The few who sink deep in the water will need a stronger down-press of the hands and some may need to add a kick in order to return to the surface.

The primary value to swimmers of this buoyancy experience lies in recognizing that buoyancy does support the body in deep water as well as in shallow and in a vertical position as well as a horizontal one. Applying this knowledge to treading, it follows that for most swimmers only a small amount of supportive effort is required to keep the head entirely above water while in a vertical position.

Many swimmers also will find the standing float to be a comfortable, resting position and may prefer it over the conventional survival float position, because the erect position of the head keeps water out of the nose. The very buoyant swimmer whose hips rise to the surface in a survival float position, making it difficult to lift the head for breathing, may also find the standing float an effective substitute.

After students have successfully experienced deep water buoyancy, any proven method may be employed to teach treading water. The following system is one which has been successful.

With students standing in shoulder-deep water, practice sculling at chest depth applying force downward for support. Emphasize the following performance techniques:

1. Keep the hands 12-20 inches from the chest so supportive force is applied relatively near the center of weight and buoyancy of the body.
2. Force should be applied by the whole arm and hand but most of the arm action should occur through flexion-extension and pronation-supination at the elbow joint. The elbows should not be extended fully at any time.
3. As the hands move away from each other in sculling, tilt the palms outward slightly so thumbs are low and little fingers higher; as they move toward each other, tilt palms slightly inward so little fingers are low and thumbs are higher. The motion is similar to spreading peanut butter on bread.
4. Apply force diagonally downward on both the inward and outward sweeps of the hands and with equal force in both parts of the sweep.
5. Keep the hands firm, flat, and aligned with the forearms; fingers should be extended and may be together or slightly separated.

Begin the practice at moderate speed until the pattern of motion is established, then increase the speed and application of force against the resistance of the water. Emphasize an awareness of the force and resistance. When sufficient force is being applied, whirlpools will appear above the hands and the student will be able to lift the feet from the bottom of the pool by bending knees and hips. Reminders about the buoyancy experience and the high levels of suspension may help students reduce body

tension and improve the effectiveness of supportive sculling. Most students will succeed in this step very quickly if sculling techniques have been carefully monitored and directed. The length of time a student can remain supported by sculling alone depends on the individual's buoyancy and arm strength.

As soon as support sculling has been successfully accomplished, even for a brief period, a leg action can be added. Either a sidestroke-like kick or a whip kick is more effective than a flutter kick and both can be introduced by demonstration and description even if the student has not had experience with them in other ways. For those who cannot find success with the side or whip kicks, a flutter kick will serve temporarily. When the kick is added, the following points should be emphasized:

1. When using the side or whip kick, the upper body should be inclined forward and the hips kept partially flexed so the body assumes a semi-sitting position with the legs and feet below the chest and shoulders. With the flutter kick, the body is held straighter so the kick is below the hips, trunk, and shoulders as the legs swing freely from the hips.
2. In treading, the hips and knees should not be fully extended at the end of the side or whip kicks. The kick should be foreshortened and "rounded off" into a slow, relaxed recovery for the next kick.
3. The side and whip kicks should be delivered at a moderate pace as a supplement to sculling and may even be alternated with sculling by reducing — not stopping — the arm action while the kick is delivered. In that way the arms may relax and rest briefly extending their endurance.

Addition of the kick to sculling may be done in standing depth water if the students can stand erect and still be chin deep, or students may be moved to deeper water with partner support/assistance provided for beginners or fearful novices. Students who stand taller than chin deep should usually be moved to deeper water for addition of the kick.

As soon as the skill of treading is fully or partially mastered, for more complete safety, the swimmer must be taught to change positions from both prone and supine horizontal to vertical for treading and from the vertical treading position to a horizontal swimming position.

In summary, the greatest deterrent to learning how to tread water is the fear of sinking. Except for infants and very young children who have not had time and/or experiences to develop inhibiting apprehensions about deep water and drowning, most novices must be taught to transfer the concept of floating in shallow water to staying afloat in deep water. When that concept is established, the swimmer will begin to overcome inhibitions about deep water.

Because the novice swimmer's most frequent response to deep water is an attempt to be vertical, with head and face above water for breathing, success and comfort in achieving that position will provide a level of self-determined security which no other technique can supply.

EVALUATION OF NOVICE SYNCHRONIZED SWIMMING SKILLS

JACKIE DOUGLASS

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Because synchronized swimming is viewed subjectively, it presents special difficulties in achieving sound evaluation procedures. The complex nature of the activity demands that multiple factors be simultaneously weighted and judged by one or more raters, whose differing opinions are likely to affect the precision of the overall judgment. Further complicating accurate evaluation is the inconsistency of individual performers in repeating the same figure.

How can one best evaluate synchronized swimming performance in view of the difficulties stated? One consideration in selecting an appropriate method is the purpose behind the evaluation. There are differences in competitive and instructional situations. In competition, using scores from 0 to 10, swimmers are judged from a standpoint of perfection. The primary intent of the rating is to place individuals in the proper order of finish according to their skill at one given point in time. Although this relative aspect of measurement is of major concern, consideration is also given to accurate placement of each individual or routine on the overall rating scale. The score should therefore serve both as a tool for placement and as an indicator of an absolute ability level. Differences between competitors are both expected and desired. As the variation in ability levels increases, the task of the judges in determining a rank order becomes less difficult.

While the relative ranking of swimmers by skill level is usually of lesser importance in an instructional setting, the need for correct identification of each individual's absolute ability is essential. Such a determination may be helpful in the assignment to an initial sequence of instruction, in the diagnosis and correction of errors, and in end-of-unit evaluations.

In view of the contrasting emphases, an alternate method of evaluating skills in a novice synchronized swimming unit is presented. The approach is based on the concept of progression. In synchronized swimming, as in most activities, a hierarchy of skills exists. Intermediate figures can be successfully performed only after fundamentals have been mastered. Moving too quickly past basics can hinder advanced work to come. Utilization of mastery levels for instruction and evaluation should help to alleviate this problem.

Using this approach, the content to be presented is identified. A specification of what constitutes mastery of the material is then made. The administration of tests to determine each student's level of achievement logically follows.

Interest is in the growth of each individual. Variability in skill level between individuals is not desirable as it is hoped that all students will be able to achieve maximum results.

One advantage to an individual progression system is that students can progress at rates suited to their individual needs. Some may spend time on vertical figures while others are concentrating on walkout techniques. If the chosen skill progression is

sound, optimal performance should result for all. Emphasis on individual progression also serves to provide a motivational factor, since advancement is so highly personalized.

Use of Ability Levels

Assignment to an ability level may be made in one of two ways. Swimmers may be pretested and placed in an appropriate skill group relevant to the material to be presented. Or, all swimmers may initially be placed in the most basic skill group. This second technique assumes no prior knowledge on the part of the students. A decision about which method to use will depend on the amount of group variability.

In either situation, progression to a higher level is possible only after satisfactory completion of specified requirements for a given level. The process is then repeated, with continued progression possible as mastery of required skills becomes evident.

Selection of Content

Of major concern in deciding which skills and figures to include in each level of a novice course is to ensure that a logical sequence is followed. There are any number of acceptable ways to present the same material. One useful principle states: All figures require sculling to support or propel the body as it moves through a series of body positions. This statement implies that the novice should be given a thorough introduction to a variety of sculls and body positions. These can then serve as building blocks for figures and originals.

A further consideration is the order in which course materials are presented. It is suggested that the instructor:

1. Present sculls in a sequence from easy to difficult. For example, the standard and the reverse standard sculls are best taught before the torpedo and the reverse torpedo. Although the techniques are the same, the two overhead sculls present an added problem in supporting body weight.
2. Present body positions in a sequence of increasing difficulty.
3. Use a combination of the most basic sculls and body positions to introduce simple figures and originals early in the course of learning. Tubs, somersaults, and oysters should be easily accomplished and provide an introduction to the concept of within-figure transitions.
4. Keep in mind that any number of factors might contribute to the difficulty of a figure. Some examples are listed below:
   a. Difficulty of scull (support), body position (vertical), or transitions from one position to another (ballet leg to crane).
   b. Length or complexity of a series of basics (sub-crane).
   c. Strength requirements of a position or a figure (ballet legs, double).

Again, the key word in developing a satisfactory progression is logic. Analyze figures to be taught and try to understand why a barracuda would be taught before a flamingo. The correct sequential presentation of skills should produce results.

Evaluation Procedures

Readiness of a swimmer to move to a higher level is demonstrated through satisfaction of a series of specified requirements. There will probably be any number of acceptable alternatives from which an instructor might select mastery tests. In choosing these, consider the amount of material covered in a level, the amount of time needed for evaluation purposes, and the length of time various tests take to administer. If it then seems advisable to limit the number of tests to cover just a

percentage of the skills presented in a level, make a representative selection. Remember, too, that it is possible to design tests that tap more than one isolated skill. However, these present greater difficulty in interpretation. The important issue in the selection of mastery standards is the existence of a strong relationship between the content and the chosen means of evaluation.

Another consideration is the selection of an appropriate cut-off point. Is a student only ready to progress to level two if every performance criterion of level one has been reached, or is mastery of 80% of the content acceptable? Are there some skills in which mastery should be mandatory and others in which mastery is desirable but not required? Answers to such questions as these are not always easy to discern. The selection of a certain mastery standard should be based on a sound rationale. It is recommended that some skills be specified as mandatory for progression, while other skills remain optional. In this way, individual abilities can be considered, yet not to the detriment of quality performance.

A Synchronized Swimming Progression

The following progression is just one way that novice figure skills might be presented and evaluated. It is not the only feasible approach, but one application of principles previously discussed. Its purpose is illustrative.

EVALUATION OF NOVICE SYNCHRONIZED SWIMMING SKILLS

Level 1

Skills	Mastery Tests	Passing Req.
Back Layout Position Stationary Scull Standard Scull Reverse Standard Scull Tub Turn & Variations Front Layout Position Canoe Scull Bent Knee Position Tuck Somersault & Variations Oyster & Variations Pike Somersaults	* (1) From a back layout position, standard scull (20 yds.), stationary scull (10 sec.), reverse standard scull (20 yds.) * (2) From a front layout position, canoe scull (20 yds.), (bent knee position optional) (3) Tub turn (4) Stationary scull, right bent knee position, left bent knee position, back tuck somersault * (5) Front pike somersault (6) Back pike somersault or oyster	* denotes required movements 2 out of 3 additional skills should be satisfactorily performed

*Order of presentation within each level is not being implied.

Level 2

Torpedo	* (1) Torpedo (20 yds.)	* denotes required movements
Reverse Torpedo	* (2) Reverse Torpedo (20 yds.)	
Overhead Scull	* (3) Vertical Position, Overhead Scull (10 sec.)	
Ballet Leg		
Ballet Leg, Submarine	* (4) Ballet Legs, Alternate	
	(5) Somersub	1 additional skill should also be satisfactorily performed
Split Position		
Vertical Position	(6) Bent Knee Kip or Porpoise	
Somersub		
Bent Knee Kip		
Porpoise		
Swordfish		

Level 3

Support Scull	* (1) Scull in Flamingo Position (15 yds.)	* denotes required movements
Lobster		
Vertical "Catch"	* (2) Dolphin or Dolphin, Foot First	
Barracuda		
Dolphin Series	* (3) Barracuda	
Crane Position	* (4) Walkover, Front or Walkover, Back	
Walkover Series		
Flamingo Position	* (5) Hybrid (Ballet Leg, Tip to Crane, Tuck, for ex.)	

Level 4 (Intermediate to Advanced)

Vertical "stop" at ankles	(1) Ballet Legs, Double, Submarine	4 out of the 6 listed skills should be satisfactorily performed
Twists, Overhead	(2) Swordfish, Straight Leg	
Twists, Support Scull	(3) Vertical Figure with Low Level Twist (Kip, Eiffel. . .)	
Knight Position		
Ballet Legs, Double	(4) Figure Which Includes a Catalina Rotation	
Catalina Rotation		
	(5) Hybrid of 4+ Positions	
Eiffel Tower		
	(6) Front Pike, 1/2 Crane Twist, Walkout	
Heron		
Swordfish, Straight Leg		
Flamingo Series		

PUBLIC RELATIONS AND AQUATIC PROGRAMS

MARY L. OPPENHEIM

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Public relations plays an important part in planning our aquatic programs. By understanding public relations, we will be able to promote our aquatic programs more effectively.

Definition

Good public relations creates goodwill between the agency and the public.

Objective

The objectives of public relations in aquatic programs include:

- Educating the public in understanding the purposes, aims, values, and services of the agency or department.
- Arousing public opinion in favor of the aquatic program and building general goodwill.
- Enlisting participation, attendance, and interest, and securing maximum use of facilities and services.
- Keeping the public conscious of the organization's continued willingness to serve.
- Reporting aquatic events.
- Guiding aquatic clubs and organizations in the adoption of projects related to aquatics.
- Emphasizing program planning, content, and procedure in the aquatic recreation.

Interpretation

Interpretation means explaining your program in terms the public can understand. In interpreting you must:

- Know the aquatic community.
- Be a good salesperson.
- Use a variety of techniques and media.
- Develop public relations' plans.

Planning

Plans are vital to successful public relations. Publicity plans should be made at

least six months in advance and are essential in a successful aquatic program. Answer the following questions in planning publicity:

- Why should this event be publicized?
- What media shall be used?
- What financial resources are available?
- What background and source material is needed?
- How will publicity affect aquatic programs and policies?
- When should publicity be released?
- Is the plan flexible enough to meet emergencies?

Media

NEWSPAPER

The newspaper is the most widely used medium for aquatic publicity and deserves detailed attention. In dealing with newspapers there are several things to keep in mind:

- Include "who, what, when, why, where, and how" in your story.
- Study the general makeup of the paper.
- Inform the editors and staff of the goals and purposes of the aquatic program.
- Try to arrange special articles with photographs.
- Become acquainted with the editors of all departments.
- Try not to use the sports page for publicizing aquatic programs.
- Secure advance copies of addresses of prominent speakers.
- Observe newspaper deadlines.
- Accommodate the press on all possible occasions.

SPEAKERS BUREAU

Speaking before different groups throughout the year can be helpful in publicizing aquatic programs. Civic clubs, parent-teacher associations, educational organizations, and other groups may want to hear about aquatics. An increasingly popular device among nonprofit agencies is the speakers bureau. Volunteers deliver basic speech material prepared for them and assignments are rotated. Good speeches can also be illustrated with slides, motion pictures, and exhibits.

PRINTED MATERIALS

There is a wide choice of printed materials useful for an aquatic program. These include annual reports, special reports, bulletins, folders, directories, guides, handbills, and posters. Such media can be expensive, and their use must be carefully planned. Photographs and illustrations are also effective.

MOTION PICTURES

Modern films, by combining auditory and visual appeal, are used increasingly for education. Good motion pictures are very effective, but production can be expensive.

RADIO AND TELEVISION

All stations are required by federal law to provide public service programs. In planning such broadcasts, determine (a) the time the program is to be aired, (b) the quality of coverage, and (c) the opportunity to advertise the broadcasts beforehand.

MISCELLANEOUS MEDIA

Trade and professional magazines — Articles should conform to the purpose of the publication.

Committees — These can help in sponsoring and promoting aquatic activities and in selling any part of the program they help guide.

Conference forums and interviews — These focus on understanding through democratic discussion.

Clearinghouse services — Aquatic agencies serve as clearinghouses and are instrumental for scheduling events for all groups.

Research — Study of current periodicals and publications will provide fresh ideas and selling points of aquatic programs.

Mailing lists and circulation of top material — Key individuals should be put on mailing lists to receive special articles and materials.

Elements in Public Relations

1. The aquatic program itself is the best instrument for building goodwill; the aquatic worker can be the best publicity agent.
2. Public opinion is the speedometer. The aquatic program must be accepted and supported by public opinion.
3. Public relations must work around the calendar. The flow of public information must be constant throughout the year.
4. Facts must be presented. Straightforward, honest publicity is the best publicity.
5. Nothing should be taken for granted. It is important to think carefully of publicity content and presentation.
6. Publicity must be planned.
   a. Illustrate the material.
   b. Use statistics and figures.
   c. Include testimony.
   d. Restate the case.
7. Established channels expedite the flow of publicity. There must be satisfactory means for the public to secure information quickly, easily, and accurately.
8. Equitable treatment is important. Public relations breaks down unless the representatives of mass communications (press, radio, television, and the like) are treated equitably. One must share advance news and observe deadlines.

Most aquatic administrators, directors, and instructors are faced with the responsibility of publicizing the aquatic events of a college, school, agency, or organization. The information in this article can help them improve their communication with the public and their agency.

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DEVELOPING AN UNDERSTANDING OF ACTION-REACTION IN FLUTTER KICKS

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"I'm not going anywhere. Why not?" asks a bewildered swimmer. This question is asked frequently by students whose ineffective performance of the flutter kick in either prone or supine position fails to produce propulsion in the desired direction. The question may be answered simply and convincingly by use of a series of drills designed to enable swimmers of advanced beginner or intermediate skill to perceive their actions and the resulting reactions in the water. Through performance of the drills and self-analysis of the results, students may become aware of effective and ineffective application of force in the two flutter kicks. They should then be able to understand why they have not been "going anywhere" and know how to improve.

Review of the Literature

The writings of prominent teachers and coaches show areas of agreement and disagreement concerning basic principles and details of leg action. There is agreement that the flutter kick is not accurately named, as the leg action neither flutters nor kicks. Torney's definition of swim kicking as "propelling the body through the water by some means of movement of the legs" can be accepted. (18:26) Other experts define the flutter kicks as oscillating or undulating action, an alternating, vertical, whip-like motion, rubberlike, loose, and pliant.

There is agreement that the flutter kick contributes to total propulsion in both front and back crawl strokes and that swimmers should learn to kick effectively. Flexibility at knees and, particularly, at ankles increases the kick's effectiveness. Inefficient movements increase drag; overkicking results in fatigue. To be effective, the feet must remain underwater. An effective kick contributes less to total propulsion than do arm movements. There is some disagreement as to the actual percentages of arm and leg contributions, but all recognize that this percentage varies from swimmer to swimmer. There is general agreement that the kick's primary function is to maintain body stability, including the streamlined position with hips and feet near the surface. Propulsion is a secondary function. Leg actions are generally more difficult to teach and perfect than are arm actions.

It is in the details of mechanics that the experts appear to disagree. A few examples illustrate these disagreements.

CRAWL: POSITION OF THE FEET

— The flutter kick . . . begins by pointing the toes. (18:26)

— The feet should not be pointed. This stiffens the leg muscles. Stiffness . . . is transmitted throughout the body, causing fatigue. (9:74)

CRAWL: DOWNBEAT PHASE

— . . . it may be best to teach the beginner to keep the leg absolutely rigid from the hip to the toe with the leg action consisting solely of hip movement. (6:69)
— The downbeat starts in the hip joint, passes through the leg with a slight knee flexing (not a bend), moves down the limb, and finishes with a whip lash of the ankle and foot. (10:22)

CRAWL: UPBEAT PHASE

— On the upward movement, the knee flexes and the ankle is relaxed. (16:22)
— Swimmers should be constantly reminded of kicking upward with a straight leg, because if the leg were to be bent at the knee on the upbeat, it would create a negative force that would hold the swimmer back. (11:34)

CRAWL: APPLICATION OF FORCE

— The whipping action of your lower leg during the downbeat is the major power phase of your kick. (15:52)
— Maximum power phase is the upswing. (13:93)
— Emphasize the up phase of your kick . . . (19:10)
— Emphasize the downbeat . . . (18:26)
— The upward leg action is as effective in propelling the crawl swimmer forward as the downward action. The slight knee flexion and powerful ankle extension as the leg completes its upward sweep contribute to the fishtail action which is capable of sending large amounts of water backward from the sole of the foot. This fishtail action is inhibited on the downward movement because of the anatomic limitation of the knee joint to flex both ways. The small amount of propelling surface presented by the instep as compared with that of the sole of the foot is also a restrictive factor in the downward beat. (2:71)

BACK CRAWL: DOWNBEAT PHASE

— On the downward motion, hip and knee flex with ankle relaxed. (16:23)
— Allow the leg, which is kept straight, to sink about 8 inches. Then bend the knee in order to allow the foot to reach a depth of approximately 18 inches. (14:27)

BACK CRAWL: UPBEAT PHASE

— . . . lead with your thigh, bend your knee, and then whip your lower leg and foot surfaces upward by extending your knee. (15:75)
— The knee leads the action upward. The foot is extended or plantar-flexed as it is driven upward. (11:95)

BACK CRAWL: APPLICATION OF FORCE

— The objective of each kick is to place each leg in the best possible position to engage the water and to push it up and forward or down and forward depending upon the directional phase of the leg swing. (13:82)
— The whipping action of the lower leg during the upbeat is the major power phase of your kick because your feet are in position to press backward at an angle to the water. (15:75)
— The action itself is almost identical with that of kicking a football. (20:22)

It must be realized that single statements, out of context, cannot convey the writer's entire meaning and may appear to say more or less than intended. Some areas of apparent disagreement may be explained by considering the expert's purpose. Those writing for student swimmers and teachers of beginning swimming have lower levels of skill in mind, while coaches wish to explain specific details of highly skilled performance. There should, however, be sufficient agreement at both ends of the skill

continuum to provide a continuity of skill development so that a beginner can progress toward the skilled swimmer level without having to learn, unlearn, and relearn details of leg actions.

These selected statements serve to indicate points of disagreement which are the same points at which student swimmers make the most mistakes. The points upon which there is general agreement can serve as the basis for building skill drills which may provide understanding and improvement of performance.

Basic Beliefs

Some basic beliefs which underlie the kicking drills are listed.

1. If the flutter kick is to propel a swimmer in the head-first direction, the force must be applied in the foot-first direction or opposite to the desired direction of travel.
2. The prone flutter kick is similar to walking forward with emphasis on the push-off backward as the foot leaves the ground. ("Push a golf ball backward with the bottom of your toes.")
3. The supine flutter kick is similar to walking backward with emphasis on the push-off forward as the foot leaves the ground. ("Like a dancer doing little kicks.")
4. The student can be led from the known to the relatively unknown by proceeding in small steps, adding vocabulary and increasing perception at each step.
5. The pool side walls can be used to provide cues to perception that cannot be provided by the surface of the water when the swimmer is in either prone or supine position.
6. Perception and understanding of the action-reaction principle may make progress faster and more complete by using fins to increase the surface area of the feet, thereby emphasizing both action and reaction.
7. While both upbeat and downbeat action contribute to propulsion and stability, the downbeat action contains the greater possibility for error.
8. Correction of errors occurring in both prone and supine flutter actions will progress more readily if the upbeat action is stressed and the downbeat action is minimized.
9. While recognizing that kicking movements originate in the hip and continue throughout the entire leg, it must be realized that students do not think in terms of starting an action at the hip joint. It is more realistic to concentrate on foot action, mention the knees only when necessary, and stress that effective action must involve the leg from the toes to the hips. Flutter kicking should resemble the action of two rubber hoses rather than that of two lead pipes.
10. Use language that creates pictures in the mind that can be easily remembered. More technical language can be introduced as understanding progresses.
11. The effective vertical width of leg action and the depth at which it provides the greatest propulsion will vary from swimmer to swimmer. Each must discover these details individually.
12. Variables such as size, weight, specific gravity, joint flexibility, relaxation, past experience with physical activities, and attitudes toward water will influence student performance.
13. Errors in performance can be named, clearly defined, and demonstrated to students. Only the individuals themselves can perceive their errors and, through understanding action and reaction, bring about improvement.
14. The teacher's role in these drills is that of leading and guiding students through the actions, assisting them to understand the results of their actions and suggesting changes in actions that will provide the desired reactions.

Special Vocabulary

Clear and relatively simple language used consistently will reduce confusion and promote immediate student understanding. It is unnecessary to use scholarly or scientific language. Many beginning swimmers and new water safety instructors need a less sophisticated vocabulary. Those who are not professionally trained teachers may better express their ideas in terms easily understood by their students without sacrificing accuracy. The terms, descriptions, and explanations suggested here may be modified to suit the age and sophistication of each class.

- Push: application of force against the water.
- Direction of push: direction in which the swimmer applies force.
- Hooked ankle: dorsiflexion.
- Stretched or extended ankle: plantar flexion. "Point your toes" implies tension.
- Head-first or foot-first: direction of travel. Since "backward" and "forward" are relative terms, confusion may be avoided by using terms relative to body parts. "Headfirst" has the same meaning in prone or supine position.
- Lead pipe kicking: moving the legs stiffly with action only at the hip joint. This results in ineffective application of force in both prone and supine positions.
- Running in place or knee kicking: moving the legs by excessive flexion at hip and knee joints followed by complete extension of hips and knees, but maintaining dorsiflexion at the ankle throughout. Some effective force is applied in foot-first direction by the soles of the feet. Counteracting force is applied in head-first direction by the thigh and upper foot, making the kick inefficient in both prone and supine positions.
- Pedalling: in prone position is similar to the leg action in pedalling a bicycle except for the application of force. The foot moves downward with the ankle dorsiflexed, preventing any effective application of force by the top of the foot. During the upbeat, force is applied by the sole of the foot pressing backward and upward. Pedalling may be quite effective if knee flexion is minimal and relaxed.
- Pedalling: in supine position is quite inefficient. Force is applied by the soles of the feet backward and downward. The upward action of the knees serves to sink the hips, bringing the trunk into a semi-vertical position where there is no backward and upward application of force on the upbeat.
- Hooking: back-pedalling. The action is similar to running in place with the addition of force being applied by the upper foot and shin in head-first direction. In emphasizing the hooking action on the downbeat in prone position, the swimmer counteracts any effective back and up action and sometimes actually draws his body in the foot-first direction. The action is ineffective in both prone and supine positions.
- Down-smashing: in prone position, extreme flexion at the knees, bringing the feet out of the water. All force is exerted downward by smashing the lower leg against the surface of the water. If the feet are deep enough, there may be some effective force application by the soles of the feet on the upbeat. The action usually results in much splashing and little head-first propulsion. Down-smashing does not usually occur in supine position.

There are, of course, other kinds of kicking errors. The ones listed here may serve to assist creative teachers in discovering the descriptive names that will convey the best word pictures to their own students. It is not suggested that these descriptions be used verbatim. Many words may be eliminated and much time saved by using a demonstrator who performs the skill while the teacher describes it in as few words as possible.

Drills to Develop Awareness of Action-Reaction

The following drills are presented as conversation. The teacher is speaking to the students who are wearing fins.

1. Face the wall in vertical position. Hold the gutter, keeping your body straight, hips, knees, and tops of fins touching the wall. Pretend that the wall is the surface of the water and you are on your back.
2. Think of your heel as a point leading the leg throughout the first part of its action. Think of the entire fin as a flat paddle. The point (heel) can move through the water with less resistance than can the paddle. There are parts of the action where you want to feel a minimum of resistance and others where you will emphasize that resistance. You minimize the actions that do not serve to move you through the water in the direction you wish to go, and you emphasize the actions that do move you in the right direction.
3. In slow motion, move the entire leg from the toes all the way up to the hip. Start the leg action by moving the foot backward away from the wall, heel leading and ankle loose. Let the fin dangle. If you keep the ankle loose, the water will slide past the fin with minimum resistance. The entire leg is straight moving away from the wall until the foot is about 15 inches away. Now, relax the knee, moving the foot a little farther from the wall. Stretch the ankle and reach diagonally backward. With the toes and top of the fin, push the water toward the wall. The entire leg straightens with the top of the fin touching the wall at the same time as the knee. If the fin touches first, that is all right. It is not all right if the knee touches first. If your hips have remained in contact with the wall, the leg is now back in starting position.
4. A little faster this time, try the right leg several times, increasing the speed until the force of the action toward the wall produces a reaction that moves the hips away from the wall.
5. Repeat these steps with the left leg.
6. Again in slow motion, try one complete right leg action, then a complete left leg action.
7. Alternating right and left, increase the speed of action until one leg is moving away from the wall as the other is moving toward it similar to the actual flutter action.
8. Still in vertical position, let go of the gutter. Keep looking at the wall. Continue the alternating flutter action, pushing the water forward toward the wall. Scull with hands near your hips. Keep kicking until you begin to back away from the wall.
9. When you are moving backward, slowly lean your shoulders and head back against the water, look up at the ceiling. Keep your body straight; don't let it buckle or sit. Keep kicking, gradually changing the direction of foot push from forward, toward the wall, to upward, toward the surface. This will bring your hips and feet near the surface of the water. When you are horizontal, kick across the pool to the other wall. Scull if you want to, or let your arms float. Remember, lead down with the heels, push up with the toes.
10. Repeat the vertical to horizontal drill one or more times. Remember, when you are vertical and kicking, think of forcing the water toward the wall with your toes and the top of the fins. When you are horizontal, the force is toward the surface. As you change from vertical to horizontal, the direction of force will change. As you get the feeling that you are toppling onto your back, and as you begin to move head-first with more speed, that is the most powerful part of the leg action for

you. That is the direction of force application that will move you best through the water. You will be kicking partly backward, toward the wall, and partly upward, toward the surface.

Flutter Kick in Prone Position

1. Hold the gutter with arms extended to the side, shoulder level, and back against the wall, touching with hips, calves, and heels. Keep your ankles loose and let the fins dangle. Imagine that the wall is the surface of the water and you are face-down.
2. Think of the knee as a point leading the leg through the first part of its action. Think of the fin as a flat paddle.
3. Move one leg from the toes up to the hip. Keeping the hips against the wall, move the knee forward away from the wall about 12 inches. Let the lower leg and fin dangle. If you can keep the ankle loose, the water will resist the fin slightly. Now, stretch the ankle, reaching diagonally forward with the tip of the fin and begin to stretch the knee. The tip of the fin will be about 18 inches away from the wall. With the toes and bottom of the fin, push the water toward the wall. Try to touch the wall with the toe tip of the fin first. It's all right if the fin and calf of the leg touch simultaneously. If the hips have remained in contact with the wall, the leg is now back in starting position.
4. Try the right leg several times, increasing the speed until the force of the action toward the wall produces a reaction that moves the hips away from the wall.
5. Repeat these steps with the left leg.
6. Again in slow motion, try one complete right leg action, then a complete left leg action.
7. Alternating right and left, increase the speed of action until one leg is moving away from the wall as the other is moving toward it similar to the actual flutter action.
8. Still in vertical position, let go of the gutter. Keep looking at the opposite wall. Continue the alternating flutter action, pushing the water backward toward the wall. Scull with hands near your hips. Keep kicking until you begin to move forward away from the wall.
9. When you are moving forward take a breath, slowly lean forward placing your face in the water. Keep your body straight; don't let it tuck or sag. Keep kicking, gradually changing the direction of foot push from backward, toward the wall, to upward, toward the surface. This will bring your hips and feet near the top of the water. When you are horizontal, kick across the pool to the other wall. Scull if you wish, or move your hands forward as though reaching for a kickboard. Breathe to one side if necessary.
10. Repeat the vertical to horizontal drill one or more times. When you are vertical and kicking, think that you are forcing the water toward the wall. When you are horizontal, the force is toward the surface. As you change from vertical to horizontal position, the direction of force will change. When you get the feeling that you are falling on your face and you begin to move head-first with more speed, that is the most powerful part of the leg action for you. That is the direction of force application that will move you best through the water. You will be kicking partly backward, toward the wall, and partly upward, toward the surface.

Pendulum Drill

1. Start in vertical position facing the wall. Begin flutter kicking, directing the force toward the wall with the toes and tops of the fins.
2. Move backward away from the wall, lean back gradually, and kick into horizontal position. Be aware of the feelings in your feet and legs as you change from vertical to horizontal. Kick across the pool but do not go all the way to the other wall.
3. Now, change from the horizontal to the vertical. Do not stop kicking at any time. Keep your body straight; do not sit or tuck. Move the head and shoulders up and forward, hands and arms extended along the surface at shoulder height until you reach the vertical. Continue kicking, lean forward, reach hands forward beyond your head, inhale, put your face in the water. Notice how your feet have changed the direction of push from backward and upward in the face-up position to an equal application of force backward and forward in vertical position, to backward and upward in the face-down position.
4. Kick across the pool almost to the starting point. Now, do another pendulum, changing from prone to vertical to supine. Lift your head, move hands across the water until they are extended to the sides, shoulder high, and you are completely vertical. Lean back in the water, bringing your hands near the hips. Keep the body straight throughout the pendulum. Notice how your feet change the direction of push from backward and upward in prone position to an equal application of force backward and forward in vertical position, to backward and upward force in the supine position.
5. Repeat the pendulum several times, until all have performed the changes of body positions smoothly with bodies straight and demonstrating the changing application of force as the body positions change.

The pendulum drills may be performed with kickboards. Instruct the students to hold the kickboard so that it rests over the hips in supine position and beyond the head in prone position. The board should be held gently and not pressed into the water.

Wall Drill Cues to Detect Errors in the Supine Flutter Kick

1. If the ankle is extended as the heel leads backward, water is being pushed away from the wall with the bottom of the fin. This represents excessive downward force in the supine position. The most obvious cues are that the tip of the fin is pointing directly downward, and the reaction will forcefully press the hips against the wall.
2. If the knee is bent to or beyond a right angle, the top part of the fin will directly face the bottom of the pool. Excess downward force will drive the body upward, causing a noticeable vertical bouncing reaction. This error, combined with #1, will provide counteracting forces and will result in little effective propulsive action.
3. If the knee contacts the wall before the top of the fin touches it in the movement toward the wall, knee kicking is being done.
4. If the tip of the fin rather than the top of the fin touches the wall, the ankle is flexed instead of extended. Hooking action is being done.
5. If both knee and tip of fin contact the wall, running in place or back pedalling may be occurring.

Wall Drill Cues to Detect Errors in the Prone Flutter Kick

1. If the ankle is hooked as the knee leads away from the wall, the tip of the fin will

point directly forward rather than downward. This represents excessive negative force during the downbeat of the prone flutter kick.

2. If the fin leads away from the wall in advance of the knee, straight leg or lead pipe kicking is being done.
3. If the knee moves upward a greater distance than it moves forward away from the wall, running in place or pedalling may be occurring.
4. If force is exerted downward by the bottom of the fin, running in place is being done. The body will be driven upward in a vertical bouncing reaction.
5. If the heel contacts the wall rather than the toes and bottom of the fin, the ankle is hooked and no force is being applied by the bottom of the fin toward the wall. This action, combined with #2, indicates very little propulsive action and greatly increased drag of the legs.

Kickboard Drills to Correct Errors in the Supine Flutter Kick

Students may be made more aware of their errors by performing moving drills with a kickboard.

Instructor: Hold the kickboard at the narrow end so that its length rests over knees and shins. If the knees contact the board at the top of the upbeat, back-pedalling or knee kicking is being done. To eliminate this, concentrate on pushing the water upward with the toes and top of the fins. Lead with the toes; let your knees follow, not lead. Some part of your lower leg ought to touch the board instead of the knees. Straighten the leg as you kick upward. Snap the top of the fin upward so that it gets to the top of the water before the knee. Keep the fins underwater at all times.

This same drill can be used to eliminate the tendency to emphasize the downbeat.

Instructor: Let the heel lead the straight leg downward. Don't push with the bottom of the fin. Touch the board with some part of the lower leg. Think, lead down with the heel; push up with the toes.

Wall Drills with Partner Holding Kickboard to Correct Errors in the Prone Flutter Kick

Students may work in pairs in shallow water. The performer will hold the gutter and kick while the partner will stand next to the feet and hold the kickboard over the feet at the surface of the water.

Instructor: If your heels are touching the board at the finish of the upbeat, try to stretch your ankle and touch the board with the toe end of the fin. Push the water toward the board with the toes and the bottom of the fins. Think, drop the knee downward, reach with the toes, push the water toward the board with the toes. Keep the knee straight during the upbeat.

Summary

At this point, students should have perceived the more obvious errors of force application. If performance does not exhibit the desired improvement, a return to the wall drills may help. While the wall represents the surface of the water, body contact with it in vertical position makes clear a good many errors that can never be perceived in the horizontal position. After several repetitions of both wall and moving drills using fins, swimmers should try the drills without fins. When former errors begin to reappear, return to the fins. Remind students to concentrate on the direction of push as backward and upward in both prone and supine positions. Ask them to state the action-reaction principle in their own words. Every member of the class should be

able to complete the statement: "In order to travel head-first, the swimmer must move the water _____ in the opposite direction — foot-first."

The teacher who has guided students through this series of drills will have given them some perception of their own performance, increased their vocabulary, and added to their understanding of the concept by analyzing details and correcting perceived errors. Students will have improved their ability to analyze, their stroke performance, and their enjoyment of swimming. The improved swimmer can say, "I know why I wasn't going anywhere, and now I can kick any direction I choose."

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ROLL A VICTIM ABOARD: YOU'LL ONLY LIFT HALF AS MUCH

ALBERT L. PIERCE

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You have a drowning victim, unconscious, in the water alongside a boat. You are giving mouth-to-mouth resuscitation, while holding a float, but the victim needs more help than you can give in the water. If the victim is heavy (e.g., 200 pounds), how can you get him into the boat quickly? Up the ladder? This isn't easy. Can you lift 200 pounds? Most boat ladders aren't very strong. If you get someone to help you there will be three people on a ladder. The extra weight is likely to cause the ladder to collapse. Besides, there is very little room for three people on a ladder. There must be a better way.

There is. You can use the victim as a pulley; this technique will cut the weight in half as you roll him/her up the side of the boat.

Let's review a little high school physics. A pulley arrangement similar to the one illustrated gives you the mechanical advantage of two people (See Figure 1.)

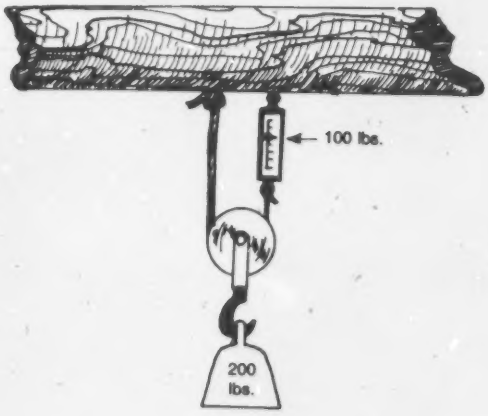


Figure 1.

That means the force required to lift a weight in this way (into the boat) equals only half the weight of the object being lifted. The same mechanical advantage applies if the weight is concentrated entirely in the pulley itself as shown in Figure 2.

Illustrations for this article were adapted from drawings by Jim Mitchell.

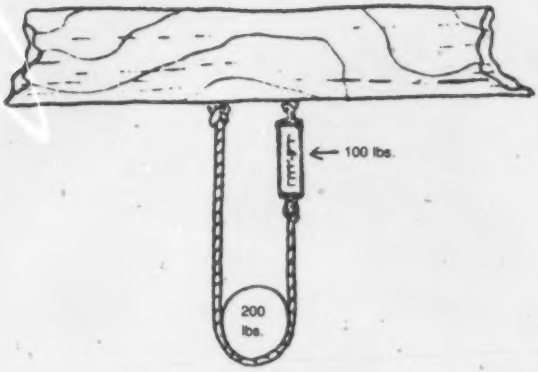


Figure 2.

If you place the 200-pound victim in a net (as shown in Figure 3), two people can roll the victim and the 100-pound weight will be divided between them. In effect, each will be pulling only about 50 pounds!

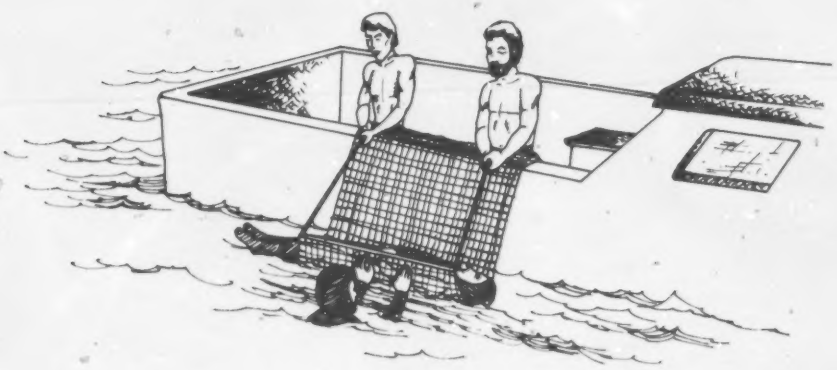


Figure 3.

You'll need someone in the water to position the victim in the net while the ropes are slack. You must also secure the top of the net to the gunwale. Either tie it or stand on it. (But don't lift your feet!) (If the unconscious person is tilted slightly head down while being rolled up, water will drain from the victim's airways.) As soon as you can reach the pole, grab it and pull. It will be easier that way.

Eugene "Jeep" Snyder, a scuba instructor in Willow Grove, Pa., designed the net illustrated. It has been used successfully in a number of simulated rescues. (See Figure 4.)

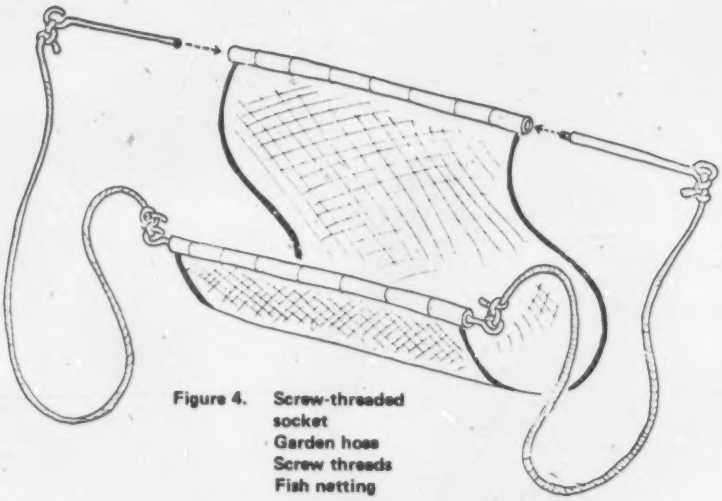
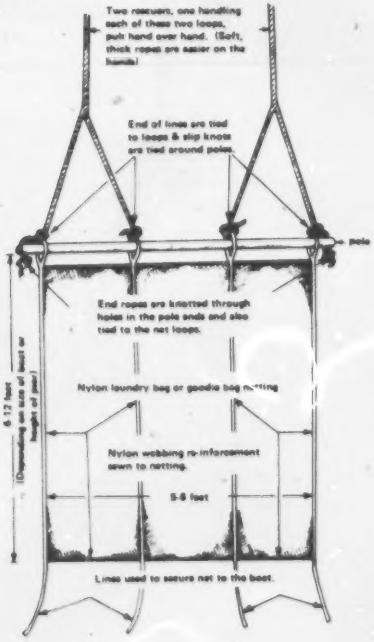


Figure 4. Screw-threaded socket
Garden hose
Screw threads
Fish netting

An alternate way of making the net is shown in Figure 5. Using this method, two rescuers can each pull on two ropes, distributing the weight along a pole. The net can also be used without a pole. The pole, preferably made of metal, will give the net weight so it will not sink, and rigidity so the waves or current will not cause it to fold. If transporting the net is a problem, you can leave the pole behind, since most boats (and pools) have a pole which will work if inserted through the loops in the net.

Figure 5.


Two rescuers, one handling each of these two loops, pull hand over hand. (Soft, thick ropes are easier on the hands)
End of lines are tied to loops & slip knots are tied around poles.
pole
End ropes are knotted through holes in the pole ends and also tied to the net loops.
Nylon laundry bag or goodie bag netting
6-12 feet (Depending on size of boat or height of pier)
Nylon webbing re-inforcement sewn to netting.
5-6 feet
Lines used to secure net to the boat.

Unfortunately you probably won't have such a net with you when you need it most. If you have a rapidly dying victim in the water and no quick way to get him/her up, there is still another method of rescue.

If you have a rope or line aboard, (and most boats do) you can rig it to obtain the same mechanical advantage. This idea was tried at the National YMCA Center for Underwater Activities at Key West with surprising success. Two persons using the ropes as shown in the diagram can easily lift someone from the water. (See Figure 6.)

First secure the ends of the ropes to something inside the boat gunwale. If there is no object to fasten the ends to, tie a knot in each end so the ropes won't slip out from under your feet. Then two of you can stand with one foot on each of the four ends. Both of you can then hold the middle of each rope and let the two loops on each side of the middle drop into the water. This will work better if the rope will sink.

The victim is positioned in the four loops by the rescuer in the water. One loop is placed under the upper back, one under the waist, one under the hips, and one just below the knees. The victim's arms should be kept inside the loops and care taken to be sure the rope under the upper back does not slip under the neck. As each rope is placed, it should be tightened so that it will remain in place while the others are positioned. If there is only one person aboard, he/she can keep the ropes snug and the victim's face out of the water while the rescuer in the water climbs out to help pull.

Both rescuers can now pull on the ropes carefully, hand over hand, as they roll the victim onto the deck. Lift with your legs and not with your back! Watch the victim and pull more on the ropes near the head to ensure a level position, or with the head slightly down to drain airways. If you have stepped on the ropes, remember not to lift your feet until the victim is over the gunwale.

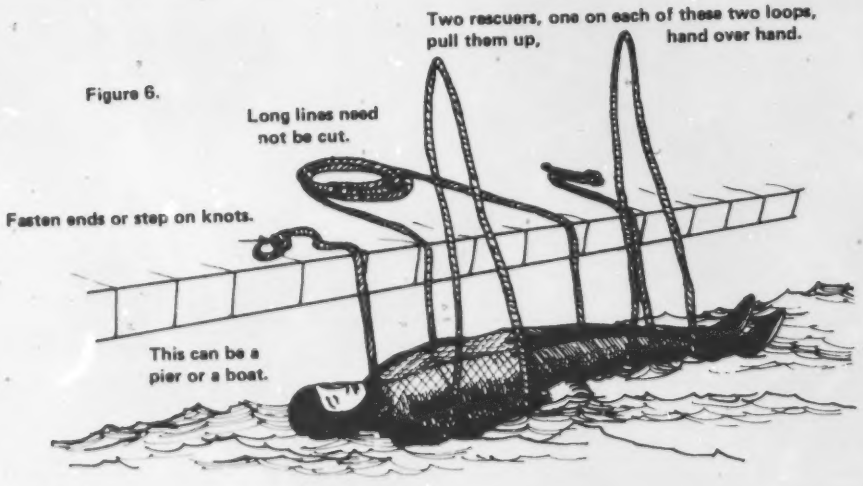

Two rescuers, one on each of these two loops, pull them up, hand over hand.
Long lines need not be cut.
Fasten ends or step on knots.
This can be a pier or a boat.

Figure 6.

You can even lift someone by yourself! Most people can roll up a victim of their own weight or less because the actual weight lifted is only half of that. For the one-person lift, the ropes should be placed in the middle of the back and the thighs of the victim. (See Figure 7.) Unless the victim is a lot lighter than the rescuer, it will be wise to secure the ropes to keep them from slipping out from under the feet.

This method works well for a conscious victim who can stiffen his/her body. It probably won't work well for an unconscious victim. However, persons simulating unconsciousness by going completely limp have been rolled up using the net.

A problem, not faced adequately in the past, is how to get a person with a neck or back injury out of a deep water diving pool, or from open water onto a boat or pier. The assumption has been that you can always float the victim to shallow water. There may not be any! Controlling the victim while fastening the body to the backboard is the major problem here. But once secured to the board, both the victim and the board

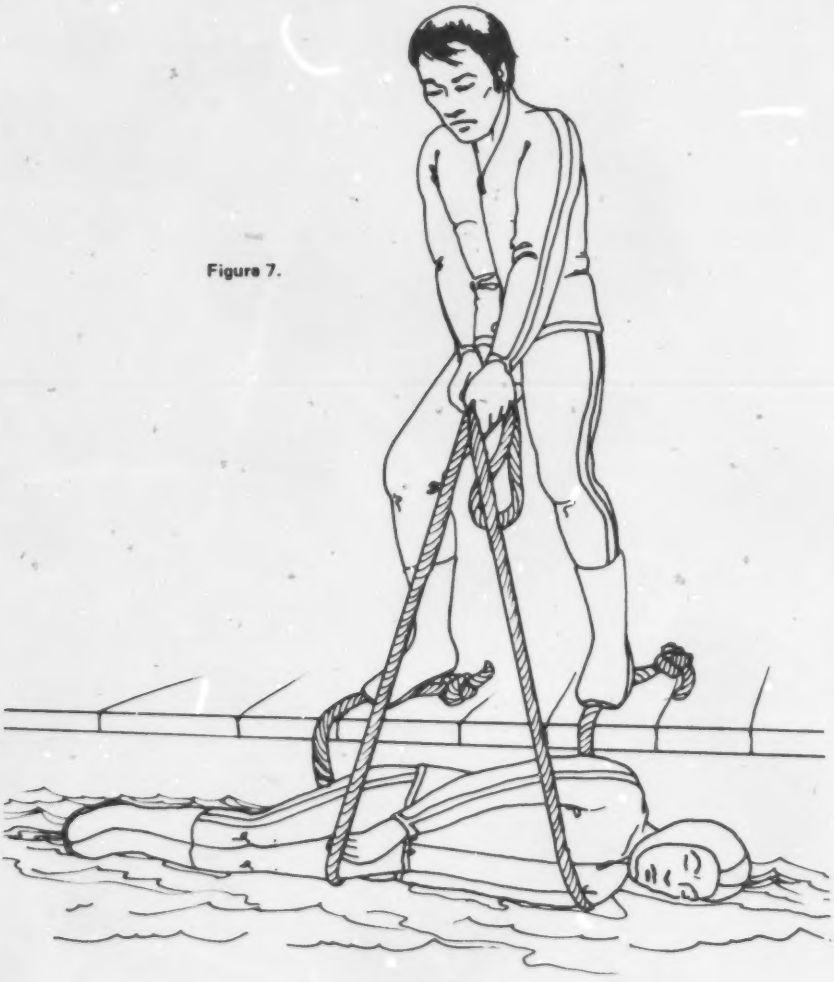


Figure 7.

can be rolled up easily by two people using either ropes or net. A canvas stretcher has been used in the same way with no problems.

Since a boat will be rocking with the waves, a victim could be injured by being swung into the hull. If rolled up quickly at the right time, this danger can be minimized. If an air mattress is available, it may be rigged like the net. Partially inflated, it will serve as a cushion. Unless the air mattress is wide, or two are used in tandem, care must be taken to be sure the victim does not slip out.

You can obtain nearly the same mechanical advantage using anything available that is strong enough to support the victim; a tarpaulin, hammock, sail, blanket, or even the garden hose usually found at boat piers and slips.

There is one problem with using any non-porous material in place of a net. Puddles of water may collect and add weight to be lifted. More importantly, however, such water might be inhaled by an unconscious victim. Conversely, if the material is too openly woven, it will be more likely to snag on any scuba gear. Accordingly, such gear should be removed before lifting.

Try these techniques. You'll be surprised how easily you can roll someone up from the water. You can practice lifting another person out of the water onto the pool deck, and from the water onto the 1-meter (low) diving board. The victim can be rolled up on either side of the board, but the head should be toward the end of the board, away from the pool deck so it won't be hit if the victim happens to slip.

When you are confident of your ability in a pool, practice in open water. Currents, waves, cold water, large boats, or high piers will make a big difference. However, the mechanical advantage you'll have will make it much easier. You may be showing someone how to save *your* life!

AQUATIC RESEARCH
1976 - 1978

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University of Wisconsin-Milwaukee

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